The Farm

QUARTERLY, AUTUMN, 1952. FIFTY CENTS

How Wedge-*in* action helps you spray crops faster–

See why Super-Sure-Grip does more work faster, lowers tire costs—

LONGER, RULER-STRAIGHT LUGS – ANGLE-ENGINEERED to converge at shoulders (A)–to take *"Wedge-In"* bites for the most powerful pull!

O-P-E-N C-E-N-T-E-R – self-cleaning, helps lugs bite deeper.

GREATER AIR-VOLUME – for more flexibility, better ground contact, bigger loads and easier ride.

LONG, EVEN WEAR – lugs work evenly, roll smoothly–and so wear slowly and evenly!

STRONGER BODY – gives added protection for long, tough service. Goodyear, Farm Tire Dept., Akron 16, Ohio.

Super-Sure-Grip–T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

500 gallons of spray-mix is a mighty dead drag—the 50-foot sprayer span is no cinch to maneuver—and slippery footing is no help at all.

But Super-Sure-Grip *ruler-straight* lugs lend help aplenty! They're *longer* for bigger bites – and "ANGLE-ENGINEERED" to come closer together at the tire's shoulders. This provides traction that holds like a *vise*—boosts you ahead—and comes out clean!

That's Goodyear's exclusive *"Wedge-In"* action you hear so much about—and it's a reason why survey after survey shows –

MORE FARMERS PREFER GOODYEAR TRACTOR TIRES THAN ALL OTHER MAKES *PUT TOGETHER!*

Look for this nearby Goodyear dealer sign for better tire values—better tire care. Convenient credit terms.

GOODYEAR

Super-Sure-Grip Tractor Tires

It's a NEW Golden Anniversary International!

"Loadability" *plus* driving comfort ...and it all costs you least to own!

New Golden Anniversary INTERNATIONAL Trucks can take punishment like a duck takes to water. They'll do a real job for you because they're built for it! They're powered with engines that deliver more *usable* horsepower—power without strain to carry loads more economically.

Yet they take a back seat to no truck when it comes to smart good looks, comfort and e-a-s-y handling! One look, one drive will convince you of this!

New "Action Styling," the widest seat in any farm truck, improved steering, braking and vision make driving a pleasure in a new Golden Anniversary INTERNATIONAL.

We suggest you do as professional truck fleet men do—buy INTERNATIONALS! Cost records show that over the years, INTERNATIONAL Trucks cost *least* to own!

See the great new INTERNATIONAL Trucks at your dealer's *today!* International Harvester Company • Chicago.

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Motor Trucks • Crawler Tractors • Construction Equipment
McCormick® Farm Equipment and Farmall® Tractors

This "MILLION DOLLAR" Bag brings Animal Health Engineering to your farm

When your veterinarian calls at your farm,

he invariably carries with him a small bag containing the tools of his profession. This bag, however, is much more than a carrying case for implements and drugs. It is the symbol of his skill in the science of Animal Health Engineering — the science he uses to save millions of dollars worth of livestock every year.

How the "Million Dollar" bag saves dollars for you

Every time your veterinarian makes his periodic examination of your herd, that's Animal Health Engineering at work: he knows you save money when injury or disease are treated while still in the early, controllable stages.

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The "Million Dollar" bag—symbol of progress

When your veterinarian detects symptoms of disease, his diagnosis may indicate the use of one of the miraculous new drugs — some so new they were unknown only a few years ago. Perhaps he may choose one bearing the name Squibb on the label. When he does, you can be confident it is of unsurpassed quality, purity and potency. As with all Squibb products, SQUIBB QUALITY IS THE PRICELESS INGREDIENT.

ACCURATE RECORDS MADE EASY! FREE!	Send for your copies of Squibb's HERD BREEDING CHART. It's designed to post on your barn wall, and makes record-keeping easy. Address SQUIBB, *Veterinary Dept.*, 745 Fifth Ave., N. Y. 22, N. Y., and tell us the number of cows in your herd.

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THE PRICELESS INGREDIENT

Farm Quarterly, Vol. Twelve, No. Three. Editorial, Circulation and Executive Offices, 22 East 12th Street, Cincinnati, Ohio. Published quarterly by F. & W. Publishing Corp. Subscription price 50c a copy; $2.00 for one year; $3.50 for two years; $5.00 for three years. Add $1.00 per year extra for rates outside the United States and Canada. Entered as second-class matter at the Post Office, Cincinnati, Ohio, under the Act of March 3, 1879. (Title Reg. U.S. Pat. Off.)

More clean corn from the field. Sure, you get cleanest picking with this new 2-row mounted NEW IDEA picker. And cleanest husking, too, because trailing husking bed, with its ten extra long husking rolls, has largest husking capacity of any mounted picker. Count on getting more down corn, too.

Want to pick cleanest, husk cleanest, get more down corn?

New 2-row mounted New Idea picker gives you more clean corn, plus important new features for greater convenience, safety, long life

NEW IDEA engineers carried out one of the most extensive development and field testing programs in NEW IDEA history, proving and improving this new picker, to make it the finest mounted picker on the market.

By a wide margin — "Pickers of the Champions." Proof from picking contests is always interesting. Since 1950, NEW IDEA pickers have won 53 titles in 50 1-row and 2-row contests. That's a record no competitor can even approach. Again in 1956, average corn loss by 1-row and 2-row NEW IDEA pickers was less than the average corn loss of all other pickers.

Fits 36 tractors. You get higher trade-in value, because no other mounted picker fits so many tractors. For safety and convenience, four controls are handled from the tractor seat — snapping roll spacing, raising and lowering snapping unit, ear deflector, and wagon elevator.

Less greasing, more safety. Here are just a few of the many new features:

- You save time with 30% fewer grease fittings on snapping unit, 50% fewer on husking unit, and two banks of 5 fittings each to upper husking roll bearings.
- Mounting ladder has been added for safety.
- New clearing rolls and rubber flights in wagon elevator give quieter operation.
- New louvered upper corn saver screen saves more shelled corn.

And there are other new features that give you more convenience, more safety, longer life, and finest performance.

Farmers tell why they buy. It's simple, honestly. Farmers use more NEW IDEA pickers because they pick cleanest, husk cleanest, and get more down corn.

Look at the new 2-row mounted picker at your NEW IDEA dealer's soon. Or write today for free literature.

Pick Cleanest, Husk Cleanest, Get more down corn

NEW IDEA FARM EQUIPMENT CO., DIVISION AVCO DISTRIBUTING CORP.

Dept. 255, Coldwater, Ohio

Please send me the following FREE literature:

- ☐ 2-row mounted picker
- ☐ 2-row pull-type picker
- ☐ 1-row pull-type picker
- ☐ 1-row pull-type snapper
- ☐ 2-row mounted snapper

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NO CLAW RIDING with Genuine Surge TUG & PULL

Parlor, Stanchion Pipe Line or Bucket — any milking machine that bears the Surge Name Plate milks with Genuine Surge downward and forward TUG & PULL that holds the teat cups down where they belong.

The SURGE SURCINGLE BREAKER CUP for STANCHION PIPE LINES.

The SURGE SIPHON BREAKER CUP for PARLOR PIPE LINES.

The SURGE BUCKET MILKER

Any claw-type milking machine that you can buy will take SOME of the milk from the cows. If you are there at the right time to give it enough help any machine will take ALL the milk from the cows.

How many minutes a milking are you willing to spend pulling down on the claw so that the trapped milk can get out?

A Surge Installation may cost you a little bit more money . . . and it probably WILL . . . but when you buy a machine with the Surge Nameplate — you've got a cow milker.

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2843 West 19th Street Chicago 23, Illinois

Surge

ATLANTA • HOUSTON • KANSAS CITY • MINNEAPOLIS
SACRAMENTO • SEATTLE • SYRACUSE • TORONTO

Using General Electric pump motors . . .

Nebraska farmer doubles crop yield with low-cost electric irrigation

"Before irrigating," says Mr. Albert A. Cornish, Springfield, Nebraska farmer, "I used to get 50 or 60 bushels of corn per acre. Now, I get double that . . . often up to 130 bushels. And, even with adequate; timely rainfall I increase my yield 30-40 per cent with irrigation."

A former soil conservation consultant, Mr. Cornish has irrigated electrically since 1945. He waters corn—his major crop—by a ditch and gated pipe system, while his supplementary crops of alfalfa, wheat and soy beans are sprinkler irrigated.

"I compared pumping costs in my area and found electricity the cheapest," Mr. Cornish states. "Also, I don't have to worry about fuel, and there's practically no maintenance with these General Electric motors."

This 10-inch A & C pump is equipped with a 40 hp General Electric irrigation motor and G-E control. The unit was installed by the Corn Belt Irrigation Supply Company of Kearney, Nebraska, and power is supplied by the Omaha Public Power District.

***Consult your pump dealer** to get all the benefits of an electric irrigation system designed for your particular needs.*

881-3

P. O. Box 1064,
Schenectady 5, N. Y.
Medium AC Motor
and Generator Dept.
General Electric Co.

FARM BETTER ELECTRICALLY

Please send me free bulletins on General Electric irrigation motors.

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MY PUMP DEALER IS_____

Progress Is Our Most Important Product

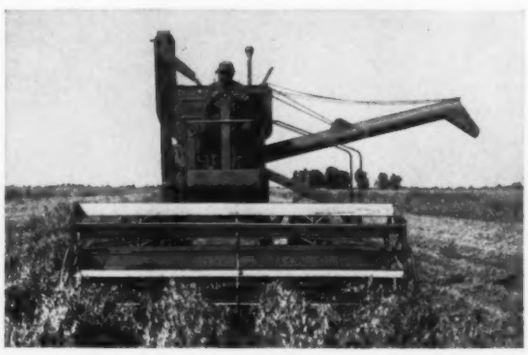
GENERAL ELECTRIC

Combining Corn Makes Good Sense *and Dollars, Too!*

A John Deere Self-Propelled is the kind of combine that appeals to your good judgment. It handles corn, beans, and grain—does a good job in each—and saves you money on every acre. Investment-wise, a John Deere Combine can't be beat because its cost is spread over so many more acres.

Combining corn with a John Deere Combine and Corn Attachment makes good sense in other ways, too. It cuts field shelling losses by 75 per cent—cuts ear losses by 50 per cent. Bean growers like a John Deere especially well because both the 8- or 10-foot 45 and the 12- or 14-foot 55 have tremendous capacity for handling heavy crops—and tall, bushy stems.

See your John Deere dealer soon for more complete information.



Just above, in the small picture, is the 55 handling 4 rows of beans. It can also be equipped with Corn Attachment. In the large picture above is the 45 Combine with Corn Attachment.

A FREE 36-page educational booklet on combining, drying, and storing of corn is yours for the asking. Also ask for a free folder on the 45 or 55 Combine. Write to John Deere, Moline, Illinois.

JOHN DEERE
MOLINE, ILLINOIS

CHECK THESE FEATURES!
Balance . . . Proportion . . . Design • PROTOLLOY Steels • Good Obstruction Clearance • Tough, Non-Slip Finish • Plainly Marked Openings.

PROTO Flat Wrenches are truly "professional quality" tools, made of specially forged alloy steel, carefully heat treated. Designs are based on scientific study to make them as slim as possible for convenience in tight places, yet reinforced properly where it counts to eliminate breakage. See your nearby PROTO dealer today. Send 10¢ for catalog of entire line to

PROTO TOOLS
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Eastern Factory, Jamestown, N.Y.
Canadian Factory, London, Ont.

A. NEW! Whitworth Combination Box & Open End Wrenches. Four sizes commonly used on foreign automobiles and motorcycles. Whitworth openings, 3/16" to 3/8". Lengths, 5 1/4" to 8 1/4". Satin chrome plated.

B. NEW! Long 6-Point Box & Open End Wrenches. Provide greater gripping area for heavier torque loads. 3/8" to 7/16" openings. 5 3/4" to 9 1/8" lengths. Satin chrome plated.

C. NEW! Ratcheting 12-Point Box Wrench. For oil filter work on new cars. 5/8" x 3/4" openings. 8 1/16" long. PROTO line now includes 6 tools in this series.

D. NEW! Double Head 12-Point 15° Box Wrench. Meets Mil. Spec. Designed for use on elastic stop nuts. Openings, 7/16" x 17/32". Length, 5 1/4". Satin chrome plated.

A5686

PROTO TOOLS
PROTO means PROfessional TOols

The Farm QUARTERLY

Autumn, 1957, Volume 12, No. 3

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THE FARM QUARTERLY
22 East Twelfth Street, Cincinnati 10, Ohio

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Winter issue on sale Dec. 6 at all Class A newsstands.

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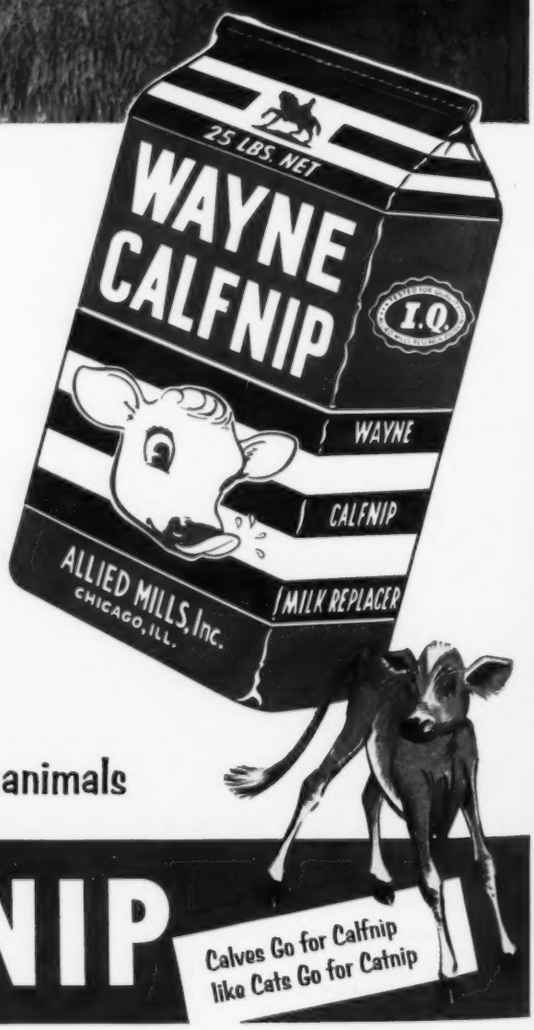

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Calves Go for Calfnip
like Cats Go for Catnip

FOR LATEST INFORMATION ON CALF FEEDING METHODS

Write to: Allied Mills Inc., Fort Wayne 1, Indiana

"We've always had good success with

FIRESTONE FARM TIRES"

says Henry Kunkler, Rte. 1, St. Henry, Ohio

"You read a lot of fancy claims about different farm tires," Henry Kunkler told us, "but we've always had more success with Firestone!"

Mr. Kunkler farms 280 acres in Ohio's rich Mercer County. No soil in Ohio is more productive—yet few soils are more destructive to tractor tires. Abrasive elements peculiar to Mercer County soils quickly wear down ordinary treads during dry spells. That's why Henry Kunkler and his neighbors prefer Firestone Champion Ground Grip® Tires. They last longer and wear better than other tires.

An ordinary yardstick can help tell you why Firestone Tires last longer. Lay the rule across the Champion Ground Grip's tough tread. You'll notice its extra width and flatter contour. It's made to grab and hold the extra ground needed for greater traction. The wide flat tread gives longer life and lower costs per year of use.

Extra traction is just one of many Firestone Tractor Tire advantages. See your Firestone Store or Dealer about all your farm tire needs. You'll find that you'll get more for your money with Firestone tires.

Henry Kunkler, Sr., left, shown here with Charlie Schrage of the Wolff Tire Service, Celina, Ohio, Firestone Dealer.

Henry Kunkler, Jr., (right) learns how Firestone's new air measure gauge indicates correct tire inflation regardless of load. The Kunklers' farm tire needs are serviced by Wolff Tire Service.

Enjoy the Voice of Firestone
every Monday evening on ABC television.

Firestone

BETTER RUBBER FROM START TO FINISH

Copyright 1957, The Firestone Tire & Rubber Company, Akron, Ohio.

the story of how

8 Men Built 1 Barn in 2 Days

USING POLE-TYPE CONSTRUCTION AND KOPPERS PRESSURE-CREOSOTED POLES

MR. FLOYD CALHOUN
Columbus, Shenango County, N.Y.

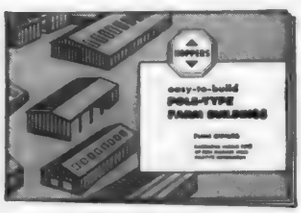
When Mr. Calhoun needed a new machinery shed he chose pole-type construction using Koppers pressure-creosoted poles. A pole-type building could be quickly built without foundation, would cost 50 per cent less than a conventional building, needed no highly skilled craftsmen, and would be long lasting and practically maintenance free.

1st Day—AM: With a 7:00 AM start, all pole holes were dug and the Koppers pressure-creosoted poles positioned and braced before 10:30. By noon, end rafters and outside plates were in place.

1st Day—PM: Inside plates, scab boards and truss rafters were nailed to the posts during the afternoon. By milking time the basic structure was completed, ready for roofing and siding.

2nd Day—AM: Two, four man crews put up the roofing and siding. By lunch time most of the roof was on and the four sides were just about up.

2nd Day—PM: Siding and roofing completed, sliding doors were framed and hung. At nightfall, Mr. Calhoun drove his tractor into 1 of the 5 bays.



WRITE FOR COMPLETE CATALOG OF POLE-TYPE BUILDING PLANS

It outlines the advantages of pole-type construction and details with pictures and floor plans the many easy-to-build plans available.

Write: Koppers Company, Inc., Wood Preserving Div., 1465 Koppers Bldg., Pittsburgh 19, Pa.

F-6

KOPPERS

KOPPERS POLES

LETTERS

Those Old-Fashioned Apples

Sirs:

I notice in your "Over the Back Fence" column that you would like some of the Apples of Yesteryear. Now, that interests me.

I have had some interesting experiences with those old varieties of apples. If you are drooling over the thought of sinking your teeth into a nice, cold, juicy Chenango, Maiden Blush, Russet, or Rhode Island Greening, I can supply you with them. Those trees are ninety years old. As to the other varieties you mention, I am sorry that I had to give way to progress and efficiency and remove a lot of big, strong, healthy, three-story, 90-year-old trees, such as Bellflower, Banana Apple, Pippin, Tolman Sweets, Sheepnose, Harvest Apple, Northwestern Greening, Black Gilliflower, and Man apples. Those varieties just would not sell alongside of my Red Delicious, McIntosh, Spies and Jonathan.

I can sympathize with you when you crave for such a simple thing as a bite out of a good cold, old, juicy Greasy Pippin. I would do chores around the barn for an hour before breakfast and give $5.00 besides just to shove my feet under a breakfast table of old-fashioned buckwheat cakes, home-made country BUTTER, home-made maple syrup, and home-made sausage, cooked on the old wood range with seasoned apple wood. Just try to get those simple things together nowadays.

Owen Morton

Kalamazoo, Michigan

Hands Off That Land

Sirs:

Congratulations on your article on condemnation in the Summer issue.

Most articles written on the subject are by representatives of the condemnors including highway officials and power companies. In fact they have an organization known as the American Right of Way Association with branches organized in many states and with committees on subjects such as public relations, legislation, etc. Such organizations exert concerted efforts in acquisition for highways and power lines, and, being experts on the subject, it is possible that the condemnee or property owner and even the general taxpayer may have his rights stepped on.

The methods used to acquire property are sometimes quite disgusting and could even be classified as improper and coercive. For example, the condemnors when approaching a property owner will offer $4000 to obtain a deed and tell him if he doesn't accept the offer they will make an award of $3500 and that he can then go to Court and spend money to get more, thus putting the property owner in fear of loss and resulting in obtaining his signature to the deed or easement. Another example is that highway representatives and probably other types of condemnors advise the property owner about facts and legal rights and thereby get deeds or easements and often that advice turns out to be wrong and it would take a difficult lawsuit to void the deed or easement signed under such conditions.

One of the important aspects of highway condemnation is the matter of access rights. Many articles on the subject are written by condemnor's representatives. There should be more articles like yours with particular emphasis on access rights from the standpoint of the condemnee and the adverse effect on the general taxpayers not abutting a highway. With the highway program this is a very important matter.

Frank X. Didier

Attorney at Law
Port Washington, Wisconsin

Short Answer

Sirs:

We need articles showing that we no longer need government agricultural workers. Fire them all and let farm managers, chemical companies and implement companies continue their work unmolested by the socialists.

Ray Umbaugh

Ocala, Florida

Tough Luck

Sirs:

Upon looking through the 1957 Winter issue of THE FARM QUARTERLY, we noticed a very, very interesting article on hydraulics—"All About Hydraulics."

We would like to know more about the demonstrator of the hydraulic hoses in the picture on page 55—age, height, color of eyes, hair, etc.—especially information concerning his marriageable statistics.

Marie Frances

Schuyler, Nebraska

He's in the Army, far away in Germany. Sorry, Marie.

"This new Super 88 is more the farmer's tractor than ever!"

"Nobody had to sell me on the new Super 88. I'm an 88 man from way-back—I like that four-bottom power. But I have to admit, with all those improvements, it's the farmer's tractor more than ever now. I mean things like the handy new three-point hitch...the new 12-volt ignition system...the new key starting. Why, there are more power 'helpers' here than you have in your car: power steering, 'Hydra-lectric' controls—even a new power shift to space your back wheels! Then, of course, you've got the comfort of Oliver's easy-riding seat, the convenience of the independent PTO. For fuel, you can take gasoline, diesel, LP-gas—whatever'll save you the most. You'll find I'm right when I say: Oliver gives me the power to produce at the lowest possible cost."

Buy your new tractor
on the
"Pay as you Produce"
purchase plan
Ask your OLIVER Dealer

YOUR OLIVER DEALER ADDS: "It's not surprising they call Oliver the *farmer's tractor*. After all, the farmer is our biggest customer. It has never been any different—with Oliver, the farmer always comes first."

OLIVER
"FINEST IN FARM MACHINERY"

The Oliver Corporation, 400 West Madison St., Chicago 6, Illinois
Also Manufacturer of the Famous Oliver Outboard Motors

BUTLER

...the farm building that never loses its usefulness

MACHINERY STORAGE AND REPAIR in the same building without any alteration! Plenty of room overhead for tall machines.

IT'S A LIVESTOCK SHELTER if you convert from grain to stock farming. Post-free interior is easy to clean mechanically, safer for animals.

No matter how your market conditions and farming practices change, the Butler building you erect for one type of farming will still be perfectly suited to your operation. For here is the *one* structure that serves so well for grain storage, for machinery storage and repair, as a livestock shelter and loafing barn, as a storage structure for feed, seed and hay.

Butler buildings are made of the perfect material for farm use—metal. They are firesafe, lightning-proof, vermin-proof, low in maintenance. Butler metal farm buildings last years longer than any other structure in their price class—and even match the life of far more expensive construction. Each panel is securely bolted to the frame for maximum protection against wind and hail. A strong steel framework provides wide-span interiors and straight sidewalls without a forest of posts to limit the usefulness of the buildings. And the special design of the building enables it to withstand grain pressures without troublesome brace rod pits throughout the floor.

A Butler building is an investment that pays off in efficiency, protection and appearance today—and continued utility for years to come.

FIND OUT ABOUT NEW and profitable ways farmers today are using Butler metal Farm Buildings. Write for the bulletin "New Uses for Butler Farm Buildings."

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7378 East 13th Street, Kansas City 26, Missouri

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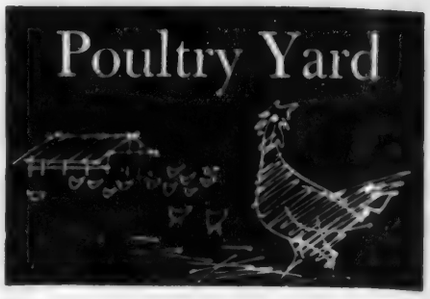


Tanned Feathers During the past few years, chicken feathers have changed from an annoying waste to, (1) feathers used as fertilizer and (2) feathers cooked and ground into a nutritious protein meal for livestock feed. Now they are tanning them. Chicken feathers in this new form are better and more durable than wild duck down—which costs some $5 a pound—in sleeping bags and arctic clothing. The feathers are cleaned, dipped in preservatives, made water repellent, swelled and distorted and given more curlyness by alkalies, and tanned in a new process developed for the Army by scientists at the the University of Cincinnati. Is there a market? The Army gives top priority to this downy fluff.

Private Eye Sees Blood A few months ago, a U. S. D. A. scientist predicted that we would soon be grading and candling eggs mechanically. Today, a private concern has built an electronic eye which will candle white eggs considerably faster and 90 per cent more accurately than humans. The machine was tested on a commercial grading line in San Diego and the results were compared with the work done by a line of trained girls. The machine, which automatically rejects eggs when its electric eye sees a blood spot, missed only one egg in three thousand where the girls missed almost four each thousand. The Agricultural Marketing Service scientists who designed the machine point out that it will not work on brown shelled eggs as yet and that it is still far slower than it need be.

Poultry History Milt Sunde, University of Wisconsin poultryman, has assembled the following bits of poultry history: Eggs were sold in barrels until 1900. The first incubator was advertised in this country in 1847 as an egg-hatching machine; in those days, however, it was thought that raising the chicks would be almost impossible without a hen. But the first artificial incubation was practiced by the Egyptians and Chinese over 2,000 years ago. Spanish explorers brought chickens to this hemisphere in the 1500's. Varro advised Roman poultrymen in 50 B.C., "The chicks ought to be driven into the sunshine, for by so doing they grow stronger and this holds good not only for chicks, but for all poultry." In 1862, one author said, "We conceive it a good hen that will lay 150 eggs the first year, 130 the second, and 100 the third year, after which she should go to the pot."

Power takes over

ALLIS-CHALMERS SPREADER EASY-LOADS AND FRONT-SPREADS A CLEAN NEW POWER WAY

Man-handling manure ends completely . . . power takes over . . . when you own the new Allis-Chalmers front-unloading spreader.

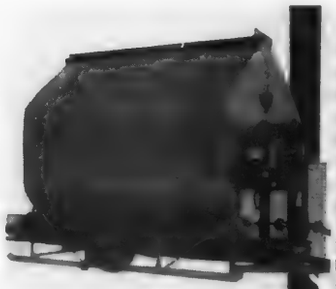
Tractor-load it from the *rear and sides*. There's no rear-beater to block the way. Load from hard-to-reach sheds, corners or barn cleaners . . . without touching a hand fork!

Front spreading is a whole new way of crop-feeding: one-lever control—thin or heavy—wide and low—out of cross-winds—comfortable for *you!*

Beaters and turbine slingers are fully enclosed like a hammer mill. The load moves *forward* as you spread—keeps load weight on the tractor drive wheels for better traction.

Team this new spreader with the easy-on, easy-off Allis-Chalmers Tractor Loader—and you'll have a pair of low-cost workers that take over one of your toughest jobs. See and price both at your dealer's.

ALLIS-CHALMERS, FARM EQUIPMENT DIVISION,
MILWAUKEE 1 ,WISCONSIN



Behlen Grain Dryer —

Famous fast drying rate and "Easy-Does-It" features have made Behlen America's top-selling Grain Dryer. Exclusive Curved-Hexagon design eliminates corners, keeps all grain at uniform distance from air-source for maximum, clear-through drying. Grain leveler (to distribute grain evenly when filling bin), catwalk and galvanized ladder are standard equipment. Models for propane, natural gas and fuel oil in 250, 375 and 500-bu. capacities.

NEW 1957 Behlen All-Steel Bar Mesh Corn Crib —

All-galvanized Behlen Crib featuring new steep-pitch roof design saves your time, permits quick, full-capacity crib filling. Eliminates hand leveling. New roof also has an easy entrance section and extra-large peak opening. Steep roof angle lets elevator lay against roof with spout directly in opening — eliminating need for extra chute and time-taking adjustment. Available in 611-bu. to 2,367-bu. capacities.

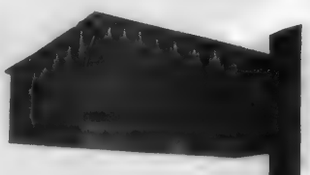
Behlen

gives you 12 months of perfect crop weather . . . every year!

You can make your own perfect crop weather . . . and actually make more money on your crops with Behlen! No need to depend on the weather to *dry* your crops before harvest. No need to take a chance on storing high-moisture-content crops—and losing money to rot and spoilage. No need to suffer crop loss because of improper storage facilities. Read how these Behlen products give you *safer, more profitable CROP STORAGE AND CONDITIONING!*

Behlen Grain Storage Bins —

Extra-deep corrugations in heavy gauge galvanized steel assure greatest strength and rigidity. Withstands the weight of stored grain without the need for cross ties, etc., in the doorway. Exclusive Double-Seal Door gives double protection — keeps grain in, keeps weather out! Available in six sizes — 1,000-bu. to 3,200-bu.



Behlen Frameless Metal Buildings—

Behlen Buildings are custom-built at standard prices — completely prefabricated to meet your specifications. Sturdy, self-framing construction of heavy gauge, channel-ridged metal permits eave-to-eave grain storage, without double walls. Pick your own grain storage capacity, one thousand to one million bushels.

WRITE TODAY for FREE Literature or SEE your nearby Behlen Dealer!

Behlen All-Steel Tunnels & Ventilators

Extra heavy gauge steel bar mesh — "Post-Fab" galvanized. Tunnels are 20" wide, 17" high. Ventilators, available in 4-ft. sections, 10" diameter.

Behlen Mfg. Co., Dept. F-9, Columbus, Nebr.

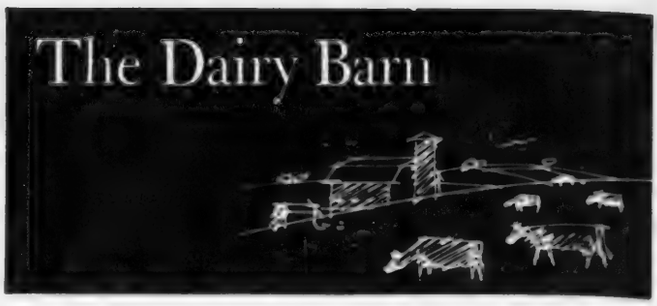
Send me, without obligation, complete information on:

☐ Grain Dryer ☐ Grain Storage Bin
☐ Frameless Metal Building ☐ 1957 Corn Crib
☐ Moisture Tester ☐ Ventilators & Tunnels

NAME:_____

ADDRESS:_____

CITY:_____ STATE:_____



Dutch Wisdom

Inspired by one of the features in our Summer issue, B. R. Van Wulfften Palthe, a reader from the Netherlands, sent us a letter we feel would be of unusual interest to all our readers and particularly to the dairymen who are so dependent upon the proper adjustment of forage to livestock. For that reason we are turning this edition of the Dairy Barn over to Mr. Palthe as guest editor. He writes:

Sirs:

Every time I receive "The Farm" I am full of expectations. What will it bring this time and—should we use it in Europe? This time "Quiz on Forage" was important to me because I am all for the use of plastic silage covers.

In this Quiz you talk about bloat. We have it too. And we found out that on those farms where bloat threatens it is a good help to feed (to afflicted cattle only) magnesia-containing cakes. But personally I regard it as a veterinary help. A good farmer—or should I write a Good Farmer —does not need them. It certainly is unwise practice to feed "too well" and combat this overdose by administering a counter-dose.

When you ask Heath "Now you are throwing in a concept here, that of quality," Heath answers: "We in America . . . have not developed too far in getting high-quality forage. . . . There is a terrific field there to be developed." True enough from what I have read about American practice. But—look well ahead before you develop! Recently a British farmer made a trip to New Zealand to have a look at cattle farming over there. Back home he gave his impressions to a group of fellow-farmers. "I wonder whether we in Britain are on the wrong track." He was struck by the *quality* of the pastures. Far *less* than he always had thought. Still N. Z. cattle have a world name as producers. Why? Because N. Z. farmers have always reproduced from those cows who did best on this (poorish) pasture. So there is *selection based on the food,* not selection based on *the possibilities of the cow.* In Britain on the contrary a cow strain has developed which has to be more or less pampered to give maximum production. That is the upshoot of this farmers' warning.

I see a parallel here to the antibiotic-fed basically poor hog. You still may crick him up—provided you use antibiotics. And how many farmers refrain from breeding such a beautiful looking animal? This way you bring basic poorness into your hog population. It gets basically weaker and that weakness—some day you will have to pay for it. There is a likeness here with the pampered cow. She becomes like a cavair-champagne-bonbon fed lady. Fundamentally unfit for breeding and she cannot rustle (except with skirts—the lady, that is).

Next comes plastic. This is practiced here too. There will be about 1000 stacks in Holland this year. In Friesland alone (and you know that Friesland stands for A-1 cattle farming) there will be 500 in use this year. The practice is spreading more slowly in the other provinces. But this I am positive about—and with me several specialists: the pit silo (concrete) is a thing that will be a curiosity in ten years' time. Plastic stack-covers are here to stay. Trouble is: one stack cover will stay for only three years—that, we think, is not enough; five/six years of effective plastic life should be the goal. You will not understand this in the U.S. because plastic sheet is relatively cheap in dollars. It is not in Dutch farmers' guilders.

The way we use it is simpler and gives good results. Imagine a "low" top hat with a small brim. The diameter greater than the height. This hat made of *white* plastic (0.15 millimeter) with thicker brim. Sizes vary from 10 ft. diameter and 5 ft. 4 in. height (58 guilders) to 20 ft. diameter and 13 ft. 6 in. height (259 guilders). A dollar is 3.80 guilders.

The stack is built with the help of a masonite ring 2 ft. high and with slightly inferior diameter than the diameter of the cover. This ring is gradually drawn up while filling. The grass is stacked when it has lost half of its weight, so approximately 40 per cent moisture remains. That is safe going without any chemical additive (molasses, acid). As soon as the stack is finished it is covered from the top down and soil thrown on the brim. You can build your stack in any spot you like. If you change the layout of your buildings you are not bound to a certain spot as with concrete silos. Should you not have completed your stack in one day—don't worry. You just cover what you have stacked and continue when you like. But never uncover a freshly built stack for more than the filling time. Because the stack is fermenting for a period of some six weeks. After those six weeks the silage is stabilized. Admittance of air during those six weeks should be avoided as much as possible.

N.V. Philips'Gloeilampenfabrieken
General Advertising Division
Eindhoven, Nederland

Sincerely yours,
B. R. Van Wulfften Palthe

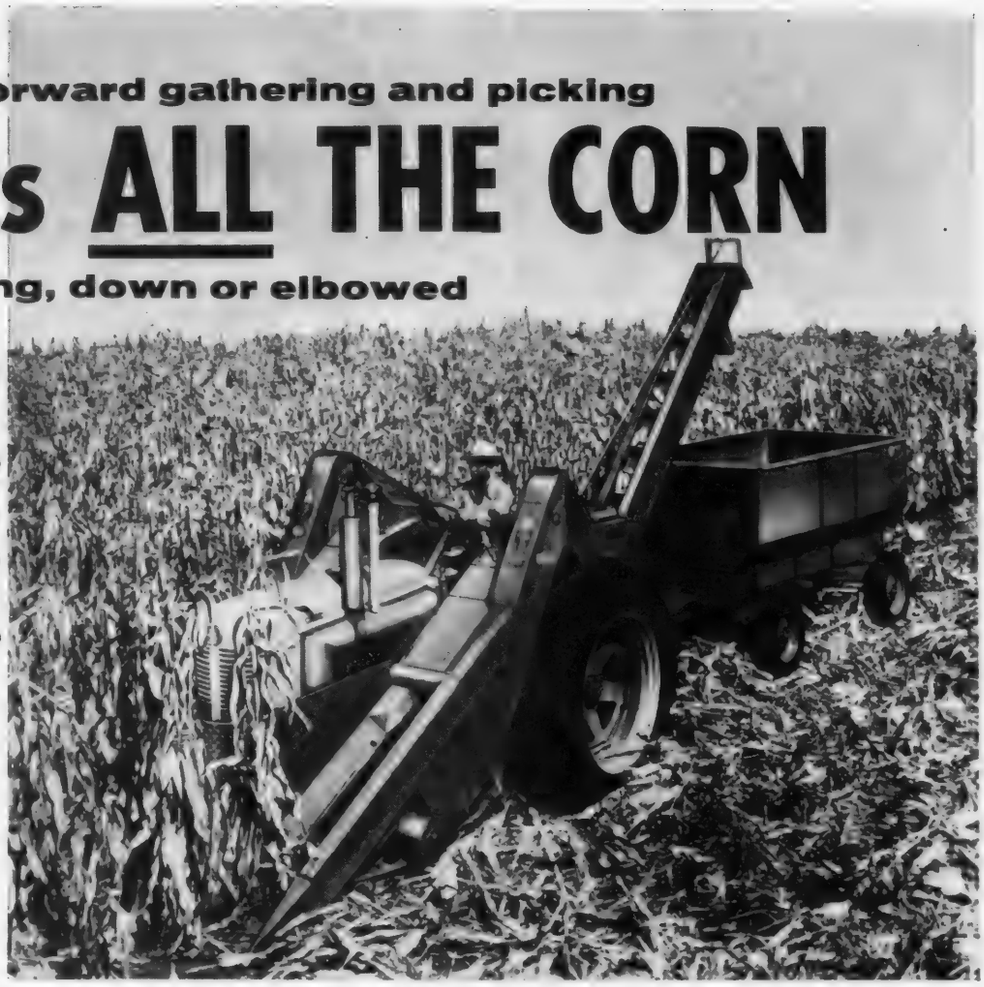
NEW forward gathering and picking

Gets ALL THE CORN

standing, down or elbowed

NEW CASE® 425

2-row mounted corn picker



Any picker will pick good standing corn . . . but how about down or elbowed corn? Here's why the new Case 425 gets *all* the corn:

- ***NEW*** short turning in operating position.
- ***NEW*** "up front" gathering points and gathering chains.
- ***NEW*** rugged spiral picking rolls adjustable from tractor seat.
- ***NEW*** high capacity wagon elevator raises automatically with picker points to clear wagon box.
- ***NEW*** four roll husking beds with shelled corn saving device below.
- ***NEW*** quick mounting and dismounting in less than an hour's time.
- ***NEW*** fast servicing . . . more sealed bearings and fewer lubrication points.

Make this an "on time" corn harvest with CASE equipment

One-Row Picker is ideal for low-cost corn picking on smaller acreages. Takes heaviest hybrid yields in stride.

Corn Harvester picks ears, saves kernels, chops and loads stalks. Converts quickly to chop entire crop for regular silage.

New 2-Row Picker-Sheller picks and husks, shells and loads in one operation. Has low grain bin for stability.

New Corn Head for Case 150 combine replaces grain header in 30 or 40 minutes, permits noontime switch from corn to beans.

Use the New Case Crop-Way Purchase Plan. Get your corn harvesting machine this season . . . enjoy its earnings right away. Make later payments at times when you have money coming in.

J. I. CASE

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1st in Quality for Over 100 Years

Mail Coupon for Complete Story

For full information, check here or add in margin any Case machine that interests you. Mail to J. I. Case Co., Dept. J-907, Racine, Wis.

- ☐ New 2-row 425 mounted picker
- ☐ One-row picker
- ☐ Corn harvester
- ☐ New 2-row picker-sheller
- ☐ Corn head for 150 combine
- ☐ Crop-Way Purchase Plan

Name_____ Student?_____

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HANDLE

Designed and balanced for easy pouring, gives firm effortless grip.

COVER

Is saucer smooth . . . easily cleaned . . . all stainless steel.

LARGE PAIL OPENING

Makes cleaning easy . . . permits visual inspection of **every inside surface.** Pail is seamless, all stainless steel.

THESE EXCLUSIVE DE LAVAL FEATURES ARE ON BOTH THE NEW SUSPENDED AND THE NEW DESIGN PAIL TYPE MILKER

DE LAVAL MAGNETIC AND STERLING PULSATORS

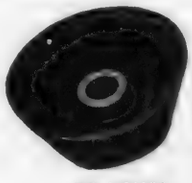
Are connected to air tube, not mounted on cover . . . give regular, even pulsations every milking, every day . . . mean top production always.

DE LAVAL "FULL-FLO" TEAT CUP

Milks faster, cleaner, better . . . cup takes proper position automatically and holds it. Neoprene liner for longest life.

DE LAVAL 70 SERIES VACUUM PUMP

Most dependable source of vacuum . . . proven on thousands of farms.



DE LAVAL MILK BAFFLE

This removable shield deflects milk away from stanchion tube and vacuum outlet.

NOW... you can see the entire inside surface!

NOW... no milk can get in the stanchion tube!

NOW... there are no operating parts on the cover!

NOW... no matter which type milker you prefer, DE LAVAL has it!

NEW DE LAVAL SUSPENDED MILKER

Here is the *perfected* suspended milker... a truly modern suspended... with revolutionary features developed by years of research. This new De Laval Suspended Milker gives you positive "Controlled Milking"... leaves nothing to chance... guarantees faster, cleaner milking with absolute cow comfort. For best milking turn to De Laval —the greatest milking hand that ever touched a cow.

PLUS A NEW DE LAVAL PAIL TYPE MILKER

FREE TEST!

Ask your De Laval Dealer for a FREE COMPARISON TEST of De Laval milking.

DE LAVAL SEPARATOR COMPANY

THE DE LAVAL SEPARATOR COMPANY Poughkeepsie, New York • 427 Randolph St., Chicago 6 • DE LAVAL PACIFIC CO. 201 E. Millbrae Ave., Millbrae, Calif.

Save production dollars on all farm jobs with these Armco Steel Buildings

Rodent-proof and weathertight Armco Grain Storage Buildings require no lining. They also can be adapted for crop drying, machinery storage or other purposes.

SHELLED CORN STORAGE
CROP DRYING
MACHINERY STORAGE
LIVESTOCK SHELTER
GRAIN AND HAY STORAGE

Armco's complete line of steel farm buildings provides a modern way to meet your building needs. You gain the economy of factory-produced buildings PLUS unmatched efficiency for a wide variety of farm jobs.

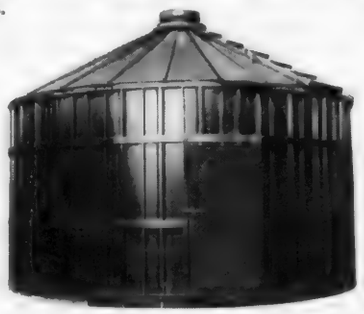
Armco Steel Buildings are rigidly constructed to withstand wind and snow loading. There's nothing in them to rot, warp or crack—*and they're noncombustible.*

These modern farm buildings can be moved or rearranged if your needs change. They are easy to dismantle and reassemble in another location.

Armco Steel Buildings are rigid in construction but flexible in the many jobs they can do on the modern farm. For complete information *call Western Union and ask for Operator 25* or mail the coupon below.

This Armco Steel Building has been adapted for loose housing of dairy cattle.

The Armco 24-ft. Special Building provides efficient, low-cost equipment storage facilities.



With interlocking steel panel construction, new Armco Grain Bins can be erected in a matter of hours.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
127 Curtis Street, Middletown, Ohio

Send information on Armco Steel Buildings for the following uses:

Approximate size _____

Name _____

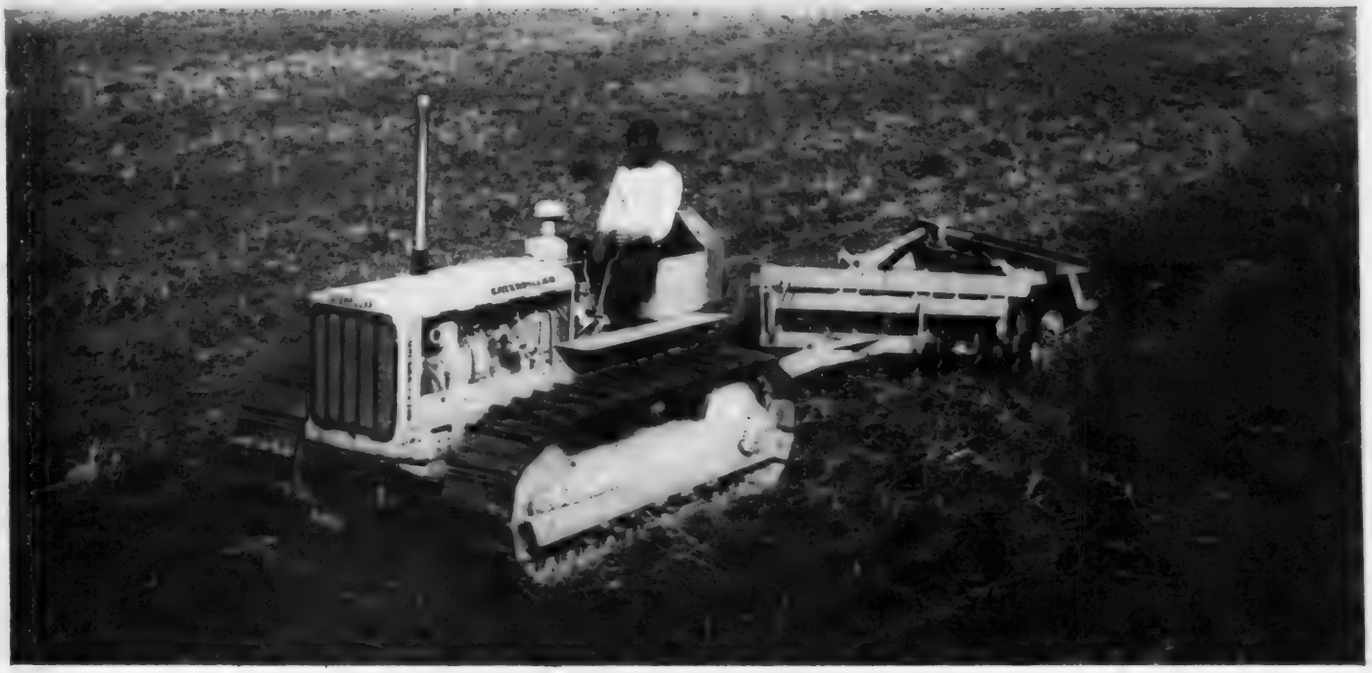
Address _____ *Town* _____

County _____ *State* _____

ARMCO STEEL BUILDINGS

ARMCO®

4 TRACTORS IN ONE!



More than a big-capacity, general-purpose tractor—*more* than a handy man tractor—*more* than a clearing tractor —*more* than an earthmoving tractor—a CAT* track-type Farm Tractor is *all* of these, and *much more!*

On general farming jobs, a Cat Diesel Tractor puts your seedbed fitting, harvesting, and heavy pulling jobs on an assembly-line basis. Here's traction and flotation to pull up to twice as big loads as ordinary farm tractors of similar horsepower . . . work capacity to accomplish up to 60% more in typical soft seedbeds . . . stability for operation over rough ground and on steep hillsides.

As a handy man, a Cat Diesel Tractor brings you unequalled versatility. Economical diesel power handles belt and PTO jobs. Manure to load in soupy feedlots? Try the Tool Bar loader. Hardpan cutting yields? Deep-till with Cat Tool Bar equipped with Subsoilers or Chisels —and cut your equipment investment. Do you have pastures to renovate . . . ditches to dig . . . land to grade for drainage, irrigation or better farming practices? The answer is a Cat Diesel Tractor!

Virtually every farmer has some land clearing problem or soil condition to correct—whether it is digging out boulders, clearing trees and brush, forming land, building terraces and other jobs. Caterpillar track-type Tractors —any size—will do them all!

How does your present tractor measure up to these specifications? If it will do only one or two of these jobs, you're getting along with 50% of a tractor! Your Caterpillar Dealer will prove it! See him soon. And write us for your free copy of "Tires or Tracks . . ." Address: Dept. FQ97, Caterpillar Tractor Co., Peoria, Ill., U.S.A.

CATERPILLAR*

*Caterpillar and Cat are registered Trademarks of Caterpillar Tractor Co.

CONSERVE MANPOWER
SOIL, WATER AND TIME
WITH CAT DIESEL TRACTORS

Carry your irrigation system on your shoulder

YOU CAN DO JUST THAT when you use USS NATIONAL* Polyethylene Pipe. This light, sturdy pipe is easy to handle, simple and quick to install. It calls for a minimum of fittings, because it is as flexible as hose. Ideal for irrigation systems, sprinkler systems, and stock watering systems—or for any farm use where you are transporting water at temperatures up to 120° F.

National Polyethylene Pipe is impervious to salts, alkalis, acids and other chemicals. It won't corrode or rot. Water freezing in the pipe won't burst it. Rough usage won't crack it. It won't stiffen . . . remains flexible and workable in temperatures from —90° F to +120° F.

National Polyethylene Pipe comes in lengths up to 400'—in diameters of from ½" to 6". Made of 100% virgin polyethylene, to which 2% of an inert black pigment filler has been added to prevent deterioration from ultraviolet rays. The smooth inner surface of polyethylene pipe offers low flow resistance to pumping and inhibits chemical deposits.

For complete details on NATIONAL Polyethylene Pipe and its uses, write to National Tube Division, United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa. Specify Bulletin No. 29. *Trademark

This seal of the National Sanitation Foundation means Tested . . . Approved . . . Sanitary

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION, PITTSBURGH, PA.
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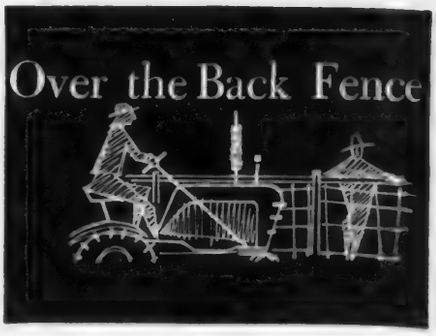
USS NATIONAL **Polyethylene** PIPE

UNITED STATES STEEL



Malabar Reclaimed

When FARM QUARTERLY was in its swaddling clothes, we here looked often toward Louis Bromfield and Malabar Farm for guidance and inspiration. Mr. Bromfield's death, in 1956, not only was a great loss to the agriculture of the world, but it appeared that Malabar, as a center of inspiration, would be lost. Now, that danger no longer exists.

Friends of the Land, "a non-profit, nonpartisan society for the conservation of soil, rain and man," and deeply indebted to Mr. Bromfield through the years, has purchased Malabar. The organization holds title to the farm, but a sizeable mortgage is held by friends of the late Mr. Bromfield in the Mansfield area and the Samuel Roberts Noble Foundation of Ardmore, Oklahoma. Several private organizations and foundations have given sums to pay off the mortgage, though much more is still needed to completely clear the debt.

Present plans for Malabar are fourfold; basically, it will be operated to demonstrate that good farming pays. Friends of the Land envisions the farm as an agricultural research center where research not adaptable to the funds and facilities of land grant colleges and their experiment stations may be pursued. This would include the testing of farm equipment.

The organization also proposes to establish an ecological institute and center at the farm, where concentrated study and research may further enable man to understand his relation to his environment. Sometime in the near future they hope to affiliate with an educational institution, so that Malabar, as an educational center in its own right, may offer study and academic recognition to graduate and foreign exchange students.

In addition to the 630 acres of Malabar Farm some 200 acres of productive bottom land will be leased from the Muskingum Conservancy District. The farm will be operated as a commercial farm until sufficient funds are collected to repay the loans. Then the research and educational activities will function as funds become available. Directors of the Malabar Project appeal to friends of the late Louis Bromfield to help speed up and carry out the proposed programs by sending gifts and donations to "Friends of the Land—Malabar Project," Hidden Acres, RFD No. 3, Zanesville, Ohio.

Fall Is the Most Profitable Time to Test Your Soil

by H. J. Atkinson, Director
Sudbury Laboratory

There are so many advantages that Fall soil testing is growing by leaps and bounds.

At this time of the year you know which land was good and which was not. You know that for next year's crops you must replace the plant food taken out of the soil by this year's harvest.

Soil tests made now will show you what was lacking in the fields where yield was unsatisfactory. Soil tests will also show what specific fertilizers are necessary in every field for greater yield and greater profit next year.

Important Advantages

With more and more farmers doing much of their fertilizing in the Fall, and also to order the right fertilizer during the winter for spring application, now is the time when you must know your soil analysis. Know exactly what to buy when prices are lowest—what to put on your ground if you are taking advantage of the benefits of Fall fertilizing. Now you have more time, the ground is easier to work, and dry enough to get on with equipment.

Experts agree that fertilizer applied in the Fall carries over to spring without loss—in many cases Fall application is even more effective than spring application.

Act Now to Save Money!

Rich fertile soil is like money in the bank—applying the **wrong** fertilizer is like throwing money away! By soil testing now, you can take advantage of the many favorable conditions to find out exactly what your soil needs to bring it to maximum profitable production. Then you can either apply your fertilizer this Fall or order your fertilizer for next spring, knowing that you are putting back into the land just what it needs for best results.

Soil testing is an absolute necessity for scientific profitable soil management. You can't afford guesswork or unnecessary losses when a Sudbury Soil Test Kit costs only $29.95. A few 10-minute tests tell you just what your soil needs. Then you can be assured of those extra bushels per acre that spell the difference between a big profit year and a poor one.

Get the Jump on SPRING

These Simple Tests Show

HOW TO

Make More Money

Every Dollar Spent For Fertilizer Can Bring Back Up To $15

Fertilizer is one of your biggest annual investments and the one that will show you the greatest return if you use it right. Used correctly it increases your profits. Used incorrectly, it is money wasted! Unless you test your soil you can only guess which fertilizer elements it lacks. Applying fertilizer by guess is not only wasteful but makes you think you're solving problems when you really aren't. Your Sudbury Soil Test Kit makes fertilizer your best investment—brings you bigger crops—cuts cost way down.

Soil Testing Is Easy—Do It Yourself!

Take your kit right out into the field and test as you go. In just 10 minutes you know exactly what the soil needs. A few tests made right at strategic locations will tell you more about your farm and its soil than you could learn in a lifetime of guesswork. Getting the right fertilizer on your land is more important than adding extra acreage. It's the yield per acre that counts—not the number of acres you work.

Farmers Lifetime Soil Test Kit

This is the famous Sudbury Farmers Lifetime Kit, complete with everything for hundreds of tests. More valuable than all your stock and tools! Shows right amount of nitrogen, phosphate and potash for each field. Also whether lime is needed (pH) and how much. Lifetime welded steel chest with carrying handle. Weighs only 12½ lb. Easy instructions show needs of 225 different crops. Big value, only **$29.95.**

Benefits of FALL Testing

- Saves you time next spring.
- Fertilizer prices are usually lower in the Fall.
- Shows what fertilizer crops have taken out of the ground.
- Soil is mellow, easy to sample, ideal for testing.
- Lets you get started weeks earlier next spring.

Get Extra Yield from Every Acre

Sudbury users all over the country report increases in both yield and quality—like the Ohio farmer who doubled his wheat crop, tripled corn and hay, boosted oats 500%. How would you like to grow up to 200 bu. corn per acre—or 700 bu. potatoes, 60 bu. wheat, 100 bu. oats, 5 tons hay, 30 tons tomatoes, 300% milk increase?

No Knowledge of Chemistry Needed

Easy as reading a thermometer. So simple even your first test will be accurate and reliable. Takes only 10 minutes, costs less than 10¢ for each valuable test.

FREE BOOK

If you send cash, we'll also include a valuable book on Farm Management, "Our Land and Its Care."

FREE TRIAL & BETTER CROPS Guarantee

We're so certain you'll get bigger yield, you can send your Kit back anytime within a year if you don't, and we'll refund your money.

SUDBURY Soil Test Kits

Sudbury is the World's Largest Maker of Soil Test Kits

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Send me the Sudbury Lifetime Soil Test Kit for free trial on your Money-Back Offer and Better Crops Guarantee. I am using the payment plan checked below:

☐ Enclosed is check or money order for $29.95. It is understood you will send prepaid, saving me $1.91 to $3.55 in delivery charges. **I am also to receive FREE the valuable book on farm management, "Our Land and Its Care."**

☐ Send my Soil Test Kit C.O.D. I'll pay $29.95 and delivery charges on arrival.

☐ **Easy-Payment Plan.** I'll pay mailman $4.95 plus delivery charges, then send you 4 monthly payments of $6.75 each.

Name.....

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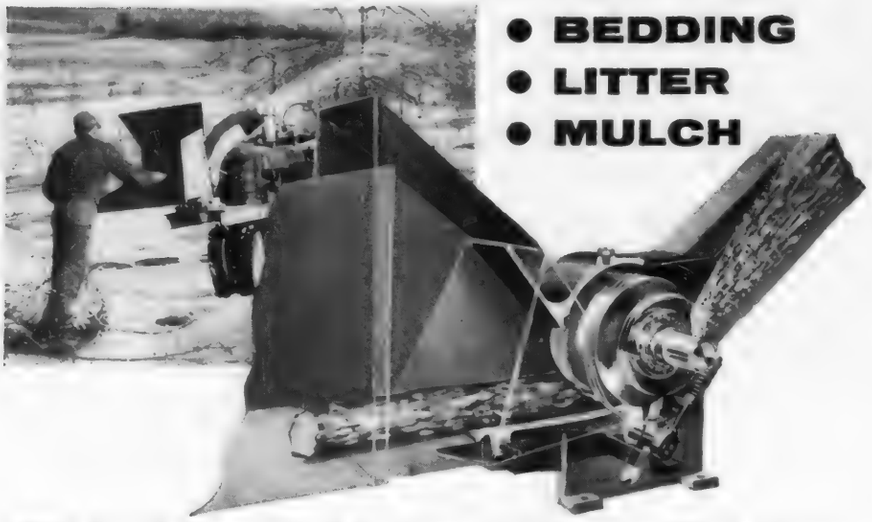
USE A FITCHBURG *Farm* CHIPPER TO MAKE LOW-COST



- BEDDING
- LITTER
- MULCH

Brush removal is always a tough farm chore . . . hard to load . . . difficult to handle. But you take the hard work out of hauling brush with a Fitchburg Farm Chipper. Brush can be quickly reduced to easy-to-haul wood chips. Chips used to make manure, or as mulch can make brush removal profitable on your farm, too. A FITCHBURG FARM CHIPPER WILL WORK FOR YOUR FARM . . .

. . . IN POUND YARDS:

Wood chip bedding stands up better in wet spots. Pound yards bedded with wood chips cake less for faster loading, easier spreading, yet the chips hold up longer near gates and water troughs. Absorbent wood chips will carry plant nutrients to crop land . . . supply crops with a humus that lasts. Seed beds crust less for better germination . . . tight ground holds moisture better . . . stays open longer.

. . . IN ORCHARDS:

Pruning disposal in orchards combines into one simple, soil building operation when a Fitchburg Farm Chipper is used. Tree trimmings need no longer be hauled. Brush can be fed into the chipper and the chips blown around the trees for mulch. This moisture-holding mulch can be worked into the ground with cover crops or left for weed control.

. . . DAIRY BARNS AND POULTRY HOUSES:

Tough absorbent wood chips really stand up in dairy barns and poultry houses. Your Fitchburg Farm Chipper will cut poultry production costs, reduce dairy barn straw requirements by producing litter and bedding from your wood lot. At clean-up time, or whenever clean bedding is needed, your Fitchburg Farm Chipper will chip bedding or litter quickly at low labor cost. Wood chips can be the answer to your difficult bedding and litter problems—A Fitchburg Wood Chipper will supply wood chips quickly and easily.

YOUR BEST FARM BUY IS

A FITCHBURG FARM CHIPPER:

The Fitchburg Farm Chipper is engineered for rugged, all-day service. Normal lubrication, with periodic sharpening of the tough chrome steel blades, keeps the Chipper on the go. Thanks to the Safety Spring-Activated Feed Plate, standard equipment on all Fitchburg Chippers, the Chipper adjusts itself instantly to different size wood to give safe, smooth chipping that keeps a Farm Chipper way ahead of clean-up crews. The economy and speed of operation will soon return the Fitchburg Chipper's price of $650 for the mulch Chipper; $960 for the bedding Chipper.

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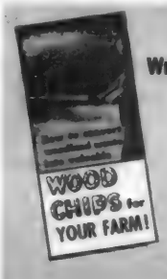

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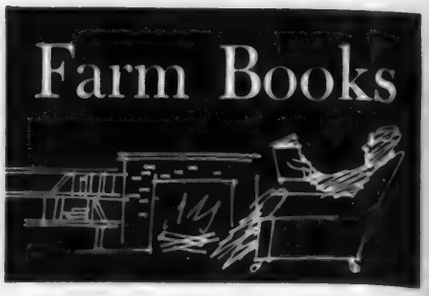

Agricultural Cooperation, edited by M. A. Abrahamsen and C. L. Scroggs. University of Minnesota Press, Minneapolis. $7.50.

Since their first formal efforts toward bettering their economic lot through cooperative early in the 1800's, American farmers have produced a rich history of cooperative effort. Starting with their cooperative creameries in New York and their wool and livestock selling pools and growing to include such enterprises as grain elevators, retail stores, marketing combines, and insurance companies, these farmer-owned businesses have a wealth of experience which has been recorded by administrators and students of cooperatives. In this 576-page volume, the editors have collected around half a hundred of the best articles on the historical, theoretical, and practical aspects of cooperative effort. These 54 articles, though each is complete in itself, have a surprising continuity in developing the general subject.

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THE FARM'S PICTURES

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The author of *Sorghum Time*, Bob Rankin, was educated at the University of Kentucky, took some law work at the University of Cincinnati, and has been a reporter for the Cincinnati Enquirer after a turn in the army after graduation. He is a specialist in outdoor writing.

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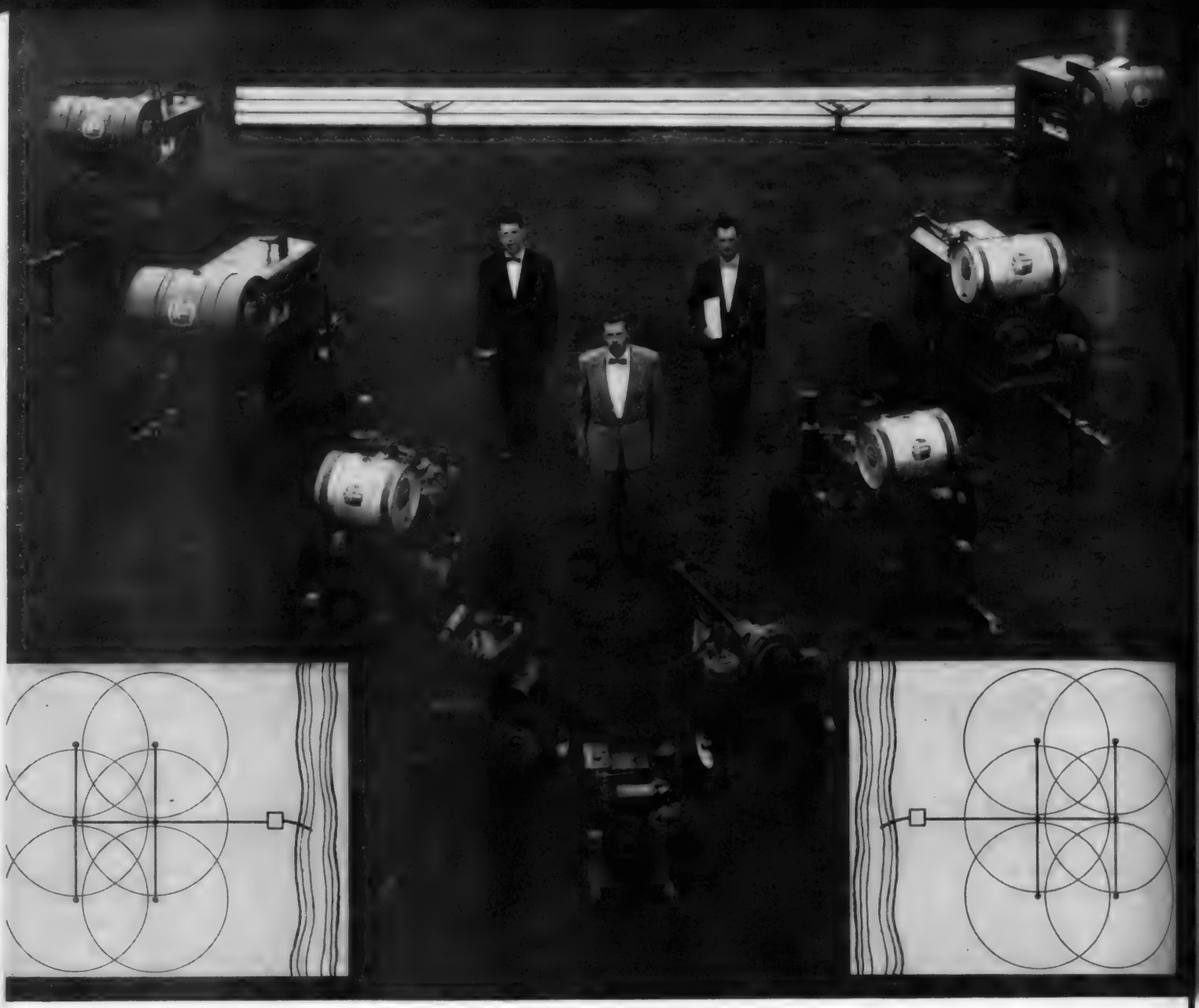

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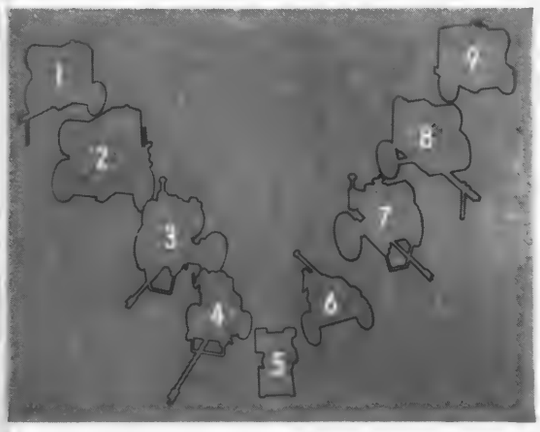

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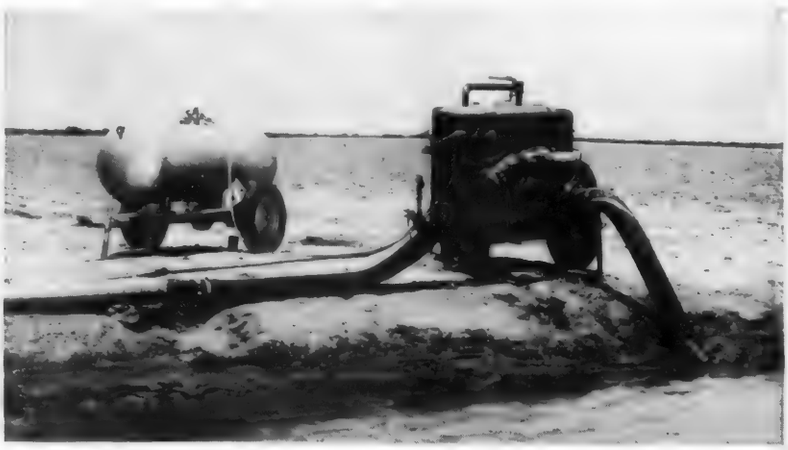

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MY HOPES FOR FARMING

By Ezra Taft Benson

Secretary of Agriculture

THE QUESTION has been raised, "Would the Secretary of Agriculture like to scrap farm programs and return farmers to the unrestricted forces of the free market?"

This question is probably the result of a letter I recently wrote to Senator Allen J. Ellender, Chairman of the Senate Agriculture and Forestry Committee, explaining to him why I felt that our present price support laws were not only failing to meet the problems of the farmers today, but were even adding to these problems.

Does this mean that I would like to scrap farm programs? The answer is an emphatic NO! Farmers cannot be expected to submit to the full force of the competitive system when other major vocations are insulated from it to a greater or less degree. They cannot be expected to extricate themselves, without help, from a situation which is a national responsibility. My concern is to try to insure that the kind of help that is given the farmers actually helps and does not add to their problems.

I feel that the present price support laws have become obsolete for two reasons. First the results that these laws were designed to bring about—and in my opinion are still bringing about—no longer fit our situations. Our high price supports were introduced in order to stimulate agricultural production to meet the great needs of war. We achieved the production that we needed and, under the Steagall Amendment, we continued that high price support after the war for a period in order to give agriculture a chance to adjust to peace-time levels of production. The war-time production was achieved and the present surplus is being piled up partly because of the stimulus of these high price supports.

The second factor which has made these present price support laws obsolete is the great agricultural revolution which has taken place in the past few years. Production per farm worker has doubled in the last 15 years and the end is far from sight. This revolution need not be spelled out to a farmer, but even to those of us who have lived with it, a listing of the elements of this revolution is impressive. The abundant supply and use of fertilizer, particularly nitrogen, is one of the elements of this revolution; the use of nitrogen not only as a fertilizer, but as a feed in the form of urea is another; and consider what has happened to other livestock feeds —antibiotics, vitamins such as B_{12}, new formulations of feedstuffs, and the use of such substances as stilbestrol have added to our feeding efficiency. And then too, we are saving hundreds of thousands of tons of feed through substitutions of such materials as feather meal for some of the protein requirements, and urea for soybean and cottonseed meal. Our livestock breeders are producing animals and birds which are able to make better use of the feeds that we provide and convert it into finer food for human consumption. And our crop breeders have produced new, higher yielding varieties which are resistant to disease and more suitable for mechanical handling.

In the fields, we have new tillage devices which have saved labor and crops; we have extended the application of irrigation water to the humid areas to save our crops during periods of drouth and increase their yields during normal years; new insecticides are saving the crops we grow; and new herbicides are saving labor and giving our crops an advantage over the weeds. New harvesting machinery and crop driers have helped build up our per acre harvest. These are some of the elements of this explosion of production which have increased yields and reduced the amount of human labor required to raise our crops. The impact of this new technology on agriculture has been to make land itself a relatively less important factor in production than it once was. This great agricultural revolution has gained such momentum that I do not feel that we can stop it—nor would we if we could. We must learn to live with abundance.

With this tremendous ability to produce and with the stimulus of high price supports, we have piled up the greatest surpluses in our history. This vast surplus reached a peak in February of 1956 when we held in government warehouses, in farm storage bins, and even in Victory ships brought out of moth-balls to act as granaries, over eight billion dollars worth of surplus farm commodities. Since then, with the help of the soil bank and a vigorous export program, we have been able to carry on a gradual reduction of our surplus holdings. But this surplus reduction program has been a costly thing—the reduction we achieved in cotton alone cost us over half a billion dollars during the last year and a half. That means that we paid a subsidy of slightly under $60 a bale to sell our cotton on the foreign market.

The tragedy of the situation is that as soon as we reduce this great surplus we run head-on into a self-defeating situation as long as the present obsolete laws are in force. With the surplus reduced the support price begins to climb back toward 90 per cent of parity, the higher support price stimulates production, and these higher prices tend to destroy markets and to price commodities out of the market.

Cotton is a good example of how our markets have been lost. Before our acreage control program, cotton grew on more than 40 million acres of our farm land. This year, the allotment is 17.6 million acres, as required by law. This was the

(*Continued on page* 102)

Boars, B'ars and Houn' Dogs

By R. J. McGinnis

COME THE FIRST CRISP October days, there'll be a great to-do around Tellico Plains, Tennessee. Ma Munz will ready up her boarding house, mountain men will oil up their 30-30's and feed up their dogs, and hunters from many states will park their cars in the steep street near Benton Byrum's butcher shop. One way or another, they'll all be after the "Rooshians."

The "Rooshians" are the wild boar which inhabit the Cherokee National Forest in Eastern Tennessee and the Nantahala National Forest in western North Carolina and eastern Tennessee. How these fierce and resourceful beasts, native to the forests of Russia and Germany, came to the forests of the southern Appalachians is becoming a legend, and like legend, has had a generous dash of make-believe added in the telling. There are gaps in the story, but any mountain man is ready and willing to fill the gaps.

It is fairly certain that early in 1912 a group of Englishmen in New York, headed by George Moore, conceived the idea of establishing a game reserve in these rugged mountains. Moore and many of his associates had hunted wild boar in Germany and Russia, and naturally the selection of boar as one of the game animals with which to stock the reserve received first consideration. A company was formed and incorporated, and bonds were sold. The proceeds were to go for leasing of the land, stocking, fencing, management, and the erection of a hunting lodge and hotel.

A large tract of land was leased near Hooper Bald in North Carolina, near the Tennessee border, about 20 miles as the crow flies from Tellico Plains, Tennessee.

The first project was to put a fence around a part of the area to contain the animals. About 1000 acres in all were fenced. A snake rail fence was built around the area where the boar were to be released and a high wire fence around the area for the other game. The cost of the lease was negligible, and the fence and the log lodge, done by cheap local labor, were not big investments. The lodge, built of logs cut on the place, was a rambling, thirty-room affair with a large common room, the last word in rustic luxury.

In April, 1912, the animals arrived. They were brought by rail to Murphy, North Carolina, reloaded in wooden cages on ox wagons, and hauled across the mountain roads to the reserve.

By far the most interesting of the lot were the boar. Accounts vary about the number and their origin. It is certain that most of them were trapped in the Hartz Mountains of Germany, but there may have been some from the Ural Mountains of Russia. Bert Woody of Tellico Plains, a retired guide and famous as a bear and boar hunter, says he saw the boar unloaded and that there were thirty of them. However, Woody is also known affectionately among his friends as the biggest liar around Tellico; he was a boy at the time, and his friends say he could not count to thirty. Official reports say there were twenty-three sows and males.

In addition to the boar there were four cinnamon bears, a larger and more gamey animal than the native black bears, five buffalo (bison) cows and a bull, a number of elk, and deer. Ten thousand English ring-necked pheasant eggs were also imported for hatching.

These mountain men guide the hunters in pursuit of boar and bear and furnish the dogs and the know-how. They live in and around Tellico Plains, Tenn., and are, left to right, Benton Byrum, who owns the butcher shop where many boars are dressed; Bert Woody, the owner of two famous dogs; Bill Thomas, the quiet one; Austin Akins, runner-up as the teller of tall tales; and Rev. Leonard Walker, by vocation a Baptist preacher.

A pack of dogs can kill a bear, but a boar is more durable and better protected. The best the dogs can do is to bring him to bay and hold him until the hunter arrives. The thrust and parry of a pack of boar dogs is a beautiful thing to see. These are Plot hounds.

As soon as the animals were out of their cages they took off with grunts and snorts into the gloom of the mountain forests; the British sportsmen in New York waited patiently for the animals to adapt themselves to their new habitat, and to multiply.

Cotton McGuire, a Carolina mountain man wise in the ways of wild animals, was engaged as gamekeeper and caretaker. He waited patiently, too, for the sportsmen to employ his skills as a guide. But the Britishers never killed their first boar on Hooper Bald, for in October, 1914, the First World War broke out, and they were called back to defend their fatherland. Cotton McGuire waited for seven years, completely forgotten in the fastness of the hills. The snake rail fence rotted down and the boar filtered into the mountains and across the line into Tennessee, over a range of close to 100,000 acres. By this time the herd had increased to an estimated one hundred. While there was no open hunting until 1939, mountain people hungry for pork made short work of those that ventured too near their cabins.

They made short work, too, of the six buffalo and four cinnamon bears which had very little defense against their dogs and long rifles. But the cunning boar and the deer, more at home in the mountains, thrived, multiplied and increased their range. McGuire managed to hold some of the elk in the enclosure and made an attempt to sell them to the conservation departments of Tennessee and North Carolina, offering to take $300 for what was left of the herd. His offer was not accepted, and one by one they died or were surreptitiously killed. Cotton McGuire is regarded in the mountains as a victim and martyr to the wild boar, for during the seven years he was at the Hooper Bald reserve he drew no wages. He got a few dollars from the sale of elk meat, but it made him a bitter man.

The herd of boar grew rapidly until 1931, when it was considerably thinned by an epidemic of hog cholera. But numbers immediately picked up again, and it is now estimated that there are 500 of the genuine animals in the area.

As soon as the boar began to escape from the fenced reserve they began crossing with the domestic hogs which the natives had from time immemorial allowed to scrounge for themselves in the forest. The resultant offsprings of this crossing was a bigger animal with hybrid vigor. The natives soon learned not to allow any of their domestic boars to run in the forest because the "Rooshian" males made short work of them. For a number of years now few domestic hogs have been turned into the forested area, and the present strain of wild boar has reverted to original type.

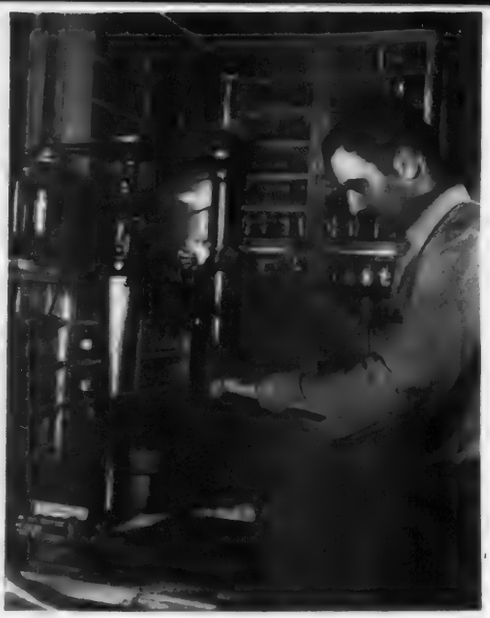
The animal is a long, thin, mean-looking critter. His shoulders are high and his body slopes to his hind quarters. Old males will reach four feet in height and weigh up to four hundred pounds. Across the shoulders and up the neck is a shield of gristle-like skin an inch or two thick which protects the animals in their customary free-for-all fights, and will turn anything but a high-powered bullet. The canine teeth on the males grow up and out, forming the tusks which are used in battle and for delving among the roots for food. Long bristles cover the shoulders and neck and extend down the spine to the tail. These bristles may be as long as five inches and each bristle is divided at the end. In the winter the body is covered with a soft, wool-like hair. The tail does not curl; it is quite long, hangs down and has a brush at the end like a mule's. When the animal is excited, it sticks its tail straight up in the air and ambles off.

The young are born in litters of four and five and occasionally up to eight. They are striped down the back and look a little like overgrown chipmunks. The stripes disappear at about four months of age. The period of gestation is apparently the same as that of the domestic hog, and there will be about two litters a year. Wild boar grow slowly; it takes four or five years to produce a big hog; the sows do not breed until two years old.

The pigs usually stay with their mother

(*Continued on page* 109)

This big pig weighed close to 400 pounds and was brought down after a ten-mile chase. Note his winter undercoat of wool-like hair.



Mechanized agriculture demands that a farmer have the skill and the tools to keep equipment rolling

By Don Burrowbridge

You Can't Farm Without

IF THOSE WHO DESIGN symbols ever get around to revising the escutcheon of agriculture they may very well replace the plow with something like a welder or an electric saw or a drill. For in this day of mechanization, most farmers could get along better without a plow than without a workshop and the tools which go with it.

Take Howard Bonner, for example. Howard represents the fourth generation of Bonners to operate a 280-acre dairy farm near Lake Villa, Illinois. "But I couldn't make it without a shop," he says.

The shop to which he has reference was built in 1949. It is 30 feet by 20 feet, with a door 14 feet wide by 10 feet high, and is located alongside a machine shed. It is heated in winter by a pipeless furnace fired by wood and scraps and is equipped with all the tools it takes to keep the Bonner tractors, trucks, field and dairy equipment and passenger cars in top running order. "None of our cars or trucks ever see the inside of a service station or a repair garage except during the rush seasons," Howard says. "We do everything right here from a grease job on up."

A walk through his machine shed is a revelation in what a man can do in keeping his equipment in shape if he has the tools to do the job and knows how to use them. Two big International Farmall tractors are the Bonner workhorses; but it has been a long time since they were colts. One is 17 years old, the other 18, and they both pack as much punch as the day they rolled off the assembly line.

"See this drawbar," Howard says as he approaches the rear of the older tractor. "Sometime ago we were plowing sod and we broke it right in two. We came on back to the shop, welded it and it's stronger then ever. We may pull the back end off that tractor some day but I doubt if we ever break that drawbar again.

"Another time we broke an axle on that big 'M' out in the field. We got a lift on it, hauled it in here, lifted it up with that one-ton hoist, pulled the wheels, put a new axle in and were back on the job in less time than it would have taken us to get a repair estimate from a garageman. It's bad enough to have to lay out cash for repairs, but when you have hay down or grain ready for the combine you're going to have an additional loss if you can't get back in action right quick."

What are the basic tools for a farm shop? That's a good question and the answer will always vary with the man. Ask a fellow like Howard Bonner and everything will begin to spill out at once. "I don't see how a man can get along without an electric welder. . . . A half-inch electric drill is essential. . . . We'd be lost without our air compressor; we paint the buildings with that thing, clean out the baler and combine and grain drill and we have more tires to keep inflated around here than a centipede has legs. Every time we start to fill silo we blow two or three tires right off the bat. . . . And if you're looking for a tool that's absolutely indispensable there's only one thing you'll have more use for than a hammer and saw, that's a set of socket wrenches. Here's a set I've had since '37. I've had to replace a piece or two from time to time but it's still the same basic set."

Then you ask a man like Roy Gundersen, another northern Illinois farmer, what are his favorite tools, and he'll reply, "I use this band saw more than any other tool in the shop. That and an eight-inch portable saw are all you need on a farm." Whereas Bonner is primarily a mechanic and likes working with metal, Gundersen prefers woodworking and each prefers the tools with which he can do his best work. In tooling up a workshop the operator will do well to purchase those tools most essential and those in which he is skilled.

The Building

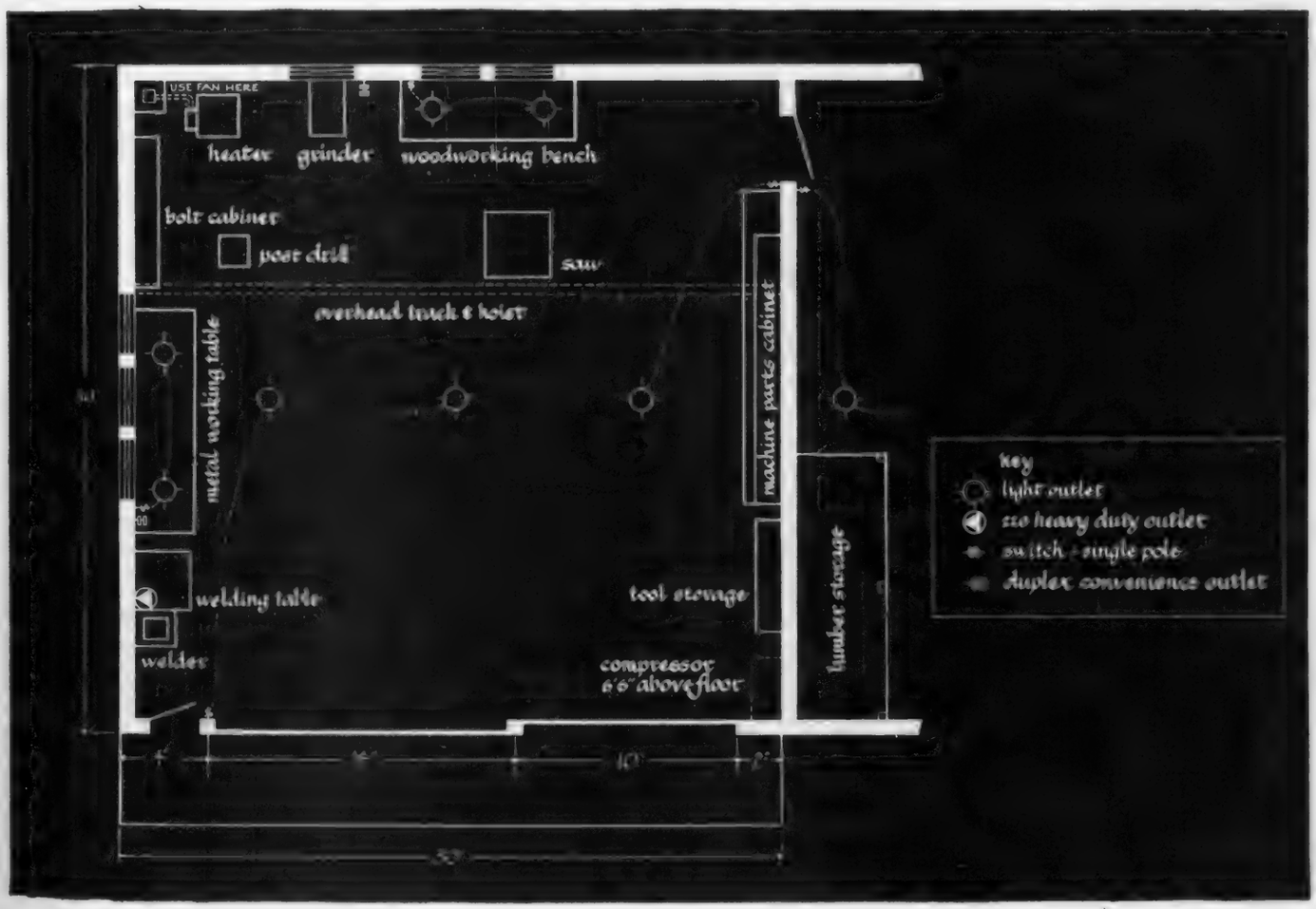
The diagram on page 33 shows a suggested layout for a farm shop. This is a square building, 30 feet by 30 feet, with a shed on one side for storage of lumber. Anyone planning on building a new shop could adapt this basic plan to fit his needs. Howard Bonner, for example, says that if he were to build a new shop he would make it 40 feet deep and use a 16-foot rather than a 14-foot door. "Trucks are getting longer all the time," he says, "and you need a good, deep shop to pull one in to give it a paint job. A wider door is handy for equipment like a combine."

The point to remember is that the building should be big enough to house all the tools, benches, bins, heating units, and other items which will be cataloged below, that it must provide a certain amount of storage space for lumber and paint, and provide safe working room around the tools and a service area for working on the equipment brought into the building.

A concrete floor is a necessary item to accommodate heavy machines and for easier cleaning; and a concrete apron beyond the door provides a handy spot for cleaning equipment and for making minor repairs and adjustments. An anchor sunk in the floor at the far side of the shop opposite the door is a very helpful device for pulling broken-down equipment into the shop.

To eliminate posts the roof should be supported by trusses; a clear area makes it easier to maneuver, park and remove equipment. Because much of the work is done at night or on rainy days, windows

While the maintenance and repair of equipment is the chief function of the farm workshop, an equally important advantage is the remodeling of old equipment and the building of new items. The plan (below) suggests the layout for a 30x30 shop and shows an efficient arrangement for the location of benches, welder, table saw, drill, tool storage and lights. Lumber is stored under an adjacent shed.



Howard Bonner is convinced his workshop is the most important spot on the farm. "When we have a breakdown," says Howard, "we fix it right now and get back on the job in a hurry."

serve primarily as ventilators rather than a source of light.

No matter how many windows there are there will still be a need for adequate electric lighting. A good rule is to provide overhead illumination of wide areas to eliminate shadows, and to floodlight work benches and permanent tools with individual, nearby lights. Each working area should be provided with about 30-foot candles of light.

Adequate wiring and outlets for equipment are a must for efficient shop operations. An electric motor is in danger of burning out if the supply of power is less than its rated voltage. Most shops need both 115-volt service and 230-volt service.

Because most tools are equipped with three-wire plugs, three-wire outlets should be provided at both voltages. Two of the wires are current carrying, the third is the safety ground wire, which grounds the metal tool housing in case of a short circuit, and protects the operator.

Ground wires should always be connected. Farmers who do not have three-prong receptacles can use adapter plugs, but should still attach the third wire to some ground—to the outlet itself if that is grounded or to a water pipe.

Flexible metal tubing to carry away gasoline exhaust fumes is an important safety device if a lot of engine work is done. This is particularly desirable in winter months when shop doors are closed.

Shop safety also can be improved by the use of color dynamics. Color conditioning of a shop improves work, lessens eye fatigue and minimizes housekeeping. The idea, with respect to machinery, is that some colors stand out more and help the operator to focus without strain on critical moving parts.

The National Safety Council and several agricultural colleges have worked up lists of tools, equipment, and suggested colors for them. Most important of these colors are:

Alert Orange: For inside of gear belt and other guards. Inside doors of switch and fuse boxes. Inside any other bench or cabinet doors where potentially dangerous equipment is kept. Tool silhouettes.

Focal Ivory: Edges of benches, tool and machine tables and interior of cabinets.

Red: For fire extinguishing equipment, including water pails, sand buckets and extinguisher mountings. Lights and flags indicating danger. Emergency stop controls on machines. Gasoline containers (but not other flammable liquids) with contents clearly marked in yellow letters.

Medium Yellow: All operating handles, levers, adjusting nuts and controls.

Yellow and Black: Edges of moving cars, trucks, stairsteps, etc.

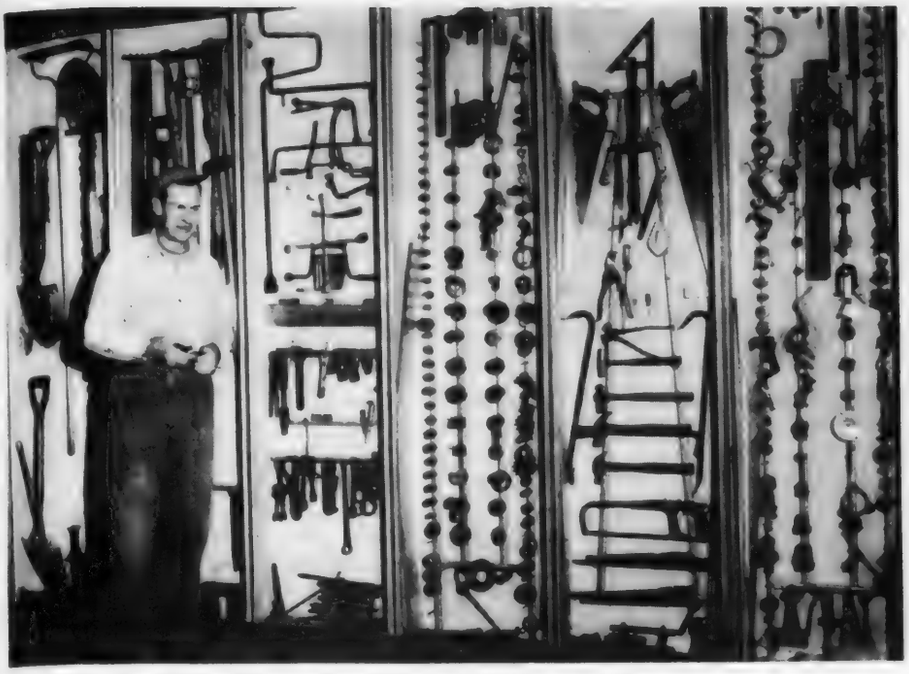
Vista Green: Body and base of machines, benches, equipment.

Safety Green: First aid and safety equipment.

Caution Blue (Medium): Power and light panels, switches and convenience outlets.

One work bench will be needed for wood working, one for metal working. Each should be at least 6 feet long (an 8-foot

The welder is not a difficult tool to master. Its uses are so numerous that it is almost indispensable on the mechanized farm.



A well-arranged rack will save the hard-pressed farm repairman many valuable hours in hunting for tools and repair parts. Peg board is an ideal material for the walls of shops. Tools of all shapes and sizes can be hung on it from ceiling to floor.

minimum is better for the metal bench) and from 34 to 36 inches high, depending upon the height of the people who will be using them.

The wood-working bench should be a sturdy 2-inch plank of hardwood covering the front 14- to 16-inches of the 2-foot recommended width. While the back of the top can be 1-inch material, it might be easier to make the top 2-inches thick.

Because of the fairly narrow width, the bench does not need legs. It can be mounted with angle iron supports attached to the wall. This leaves room for storage underneath, or for a castered tool rack that can be moved to jobs away from the bench.

The metal-working bench should be made of 3-inch bridge planks. If a 2-inch top is used, it will hold up better if covered with ⅛-inch sheet steel.

Three vises are recommended. Mount two machinist's vises, preferably with swivel bases, for greater accessibility in pipe work, on the metal-working bench. These should have 4- or 5-inch jaws, and one should have pipe vise equipment. A quick-acting woodworker vise is needed on the other bench.

Nuts and Bolts and Bins

A big share of farm maintenance work is simply a matter of having on hand the right size nut or bolt or part. Howard Bonner uses rows of boxes in one corner of his shop to hold such items as nails, nuts, bolts, screws, staples, washers, and other small supplies. When purchased in bulk these items usually come in boxes with a label included stating their kind and size. Bonner pastes this label on his storage boxes so he can see at a glance just what item is in each box.

Peg board panels fitted with hooks provide the most convenient arrangement for keeping tools in place over the work benches where they are at hand for immediate use. It is becoming rather common practice to line the walls of the shop with peg board so tools can be hung practically anywhere. Painting an outline of the tool on the panel is a big help.

Bins should be used for storing machinery and electrical parts. Bottom compartment should be deep (30 inches), wide (48 inches), and high (24 inches) to hold the largest parts. Top bins are best for smaller parts.

Tooling Up

A variety of hammers, hand saws, wrenches, pliers, screwdrivers, files, and other hand tools are basic. Their cost is relatively low and a man can't go far wrong in buying what he needs for his shop. But when it comes to power tools, which represent a fairly substantial investment, the selection must be made with care. One of the purposes of the Thor Research Center for Better Farm Living set up recently on a farm near Huntley, Illinois, is to act as a kind of proving ground for these power tools.

One of the first conclusions to come out of that center is that while a farmer needs a sturdy and reliable tool he need not go the expense of buying the kind of heavy duty equipment designed for machine shop or industrial use where the item is in daily use throughout the year.

His criterion in buying any power tool should be: "Will I use this enough to warrant paying for it? Will it do the jobs I want it to do?" Based on this criterion the following is a list of power tools which farmers who are looking for real service from their shops will find pretty important.

1. A bench grinder, preferably equipped with illuminated eye shields and tool rest. This is necessary for sharpening tools and light grinding jobs. Suggested specifications are ½ horsepower; 3,600 revolutions per minute; 115 or 230 volts; sealed ball bearings; wheel 7 inches in diameter and 1 inch wide, with a ⅝-inch center hole. Price range, $100 to $115, plus $20 to $30 for needed accessories.

If an electric motor is already available, the cost of this item can be reduced materially.

2. A portable electric drill, with ⅜-inch capacity in steel and ¾-inch capacity in hardwood. No-load speed of 1,000 r.p.m.; geared key chuck; sealed bearings; weight about five pounds. Can be mounted into lever-operated drill press. Price range, $35 to $45 plus accessories. A drill with ½-inch capacity in steel, 1⅜ inches in wood, with a no-load speed of 450 to 550 r.p.m. sells for $55 to $80 plus accessories.

3. An electric impact wrench with ½-inch square drive spindle. This is a new tool on the farm scene and can, in most cases, eliminate the need for a half-inch drill and a portable grinder. With attachments, it can drill, grind, tighten, and remove most nuts, bolts, and screws, tap and ream, wire brush, sand, hole saw and perform other common farm jobs. Suggested specifications are 1,900 blows per minute; reversing switch; ½-inch capacity in steel, one-inch in hardwood. Price range $85 to $105 for basic tool, plus $15 to $50 for most-used accessories, including hexagonal sockets from ⅜-inch to 1-inch. While this is a brand new tool so far as farmers are concerned it is one which will probably catch on in a hurry.

(*Continued on page* 104)

The Farm Tool is a new item. It handles like an impact wrench; can drill, tighten and remove nuts and bolts and do a host of other jobs.

COTTON CHAMPS

The latest and best in machinery, subsoiling, complete irrigation, maximum fertilization, and close attention to the crop have made the Pruett Brothers cotton champs of Mississippi

Jahue Pruett, the elder of the two Pruett brothers, is the spark plug of their cotton, bean, and cattle operation. In the background and above is part of their $100,000 investment in equipment. The Pruett brothers were share croppers nine years ago, today own 1,600 acres of Delta land.

IN COAHOMA COUNTY, Mississippi, one of the leading cotton growing counties in the nation, some hundreds of farmers shower cotton seeds into the red clay each spring. When they get their cotton checks most of them find they have worked the season for less than a dollar an hour. Sharecroppers never get rich on cotton.

Nine years ago, one of the sharecroppers getting along from hand to mouth was Jahue Pruett; another was his brother, Jesse. Today, an incredibly short nine years later, these two men own 1600 acres of fine Delta land and $150,000 worth of machinery and equipment.

In a period when the west was sapping the cotton markets of the south, how could any two men do this, short of using a mask and a gun?

To find out, *The Farm* sent one of its editors to Clarksdale, the county seat of Coahoma County, and the Pruett plantation. It is true that nine years ago the Pruetts had nothing in the way of land and only enough equipment to carry them along as sharecroppers in a small operation. He found out, too, that they are smart men; everybody admits that, but that doesn't tell the story. They are good men, too, both members of the Baptist church and they work hard. But there are still other ingredients of success and they practiced them all.

Jahue is the elder of the two Pruett brothers. He is 32, and the spark plug of the outfit. Nine years ago both he and his brother were cropping 175 acres in Quitman County. They had saved a little money, a very little, and when 600 acres of sandy loam near Clarksdale came on the market they put their little nest egg down on the place.

Bob Lewis, Coahoma County Agent, says the Pruett boys are always the first to take a chance on a new thing. The first new thing they tried at Clarksdale was irrigation. They tried irrigation in a small way in 1951 and saw it was good. The next year they added to the system and in 1954 more than doubled their equipment when they installed surface irrigation with gated pipe. They now have 1300 feet of main line for sprinklers, and 4,000 feet of laterals. They have 1½ miles of gated pipe. The sprinklers are high pressure, with unit pumps powered by motors. The gated pipe is fed by tractor-powered pumps which draw water from Big Creek bayou, a very handy and never-failing stream which runs through their Clarksdale place. Irrigation has more than doubled everything around the Pruett plantations—cotton, corn, soybeans, pasture, and, of course, labor requirements.

The second innovation which the Pruetts introduced to Coahoma County was subsoiling. "We have a plow sole or hard pan here," says Jahue Pruett, "and we saw that the tap root of the cotton was spreading out on the hard pan. We had heard of these sub-soilers and we brought one in and tried it out and now every field gets a subsoiling every year.

The Pruetts very early took up with anhydrous ammonia and they are always watching for new developments in insecticides, defoliants, and new seed. Boll weevil poison is put on by a commercial flying service and a dealer with a new imple-

ment finds ready listeners in the Pruett boys. They listen, too, to the county agent and they cast an appraising eye on every successful operation in their community.

How the Pruetts Grow Big Cotton

If you ask Jahue Pruett how he and his brother grow big cotton he is very likely to look you straight in the eye and tell you, "The Good Lord has been good to us," for he is a Godly man, and prays in public. However, he knows the Lord helps those who help themselves. The Pruett boys can tell you only their work-day method of growing better than two bales to the acre on 600 acres of cotton, better than 40 bushels of soybeans per acre. "The rain, the sunshine, the Lord, and chance have a part." To these Jahue Pruett says, "We don't know what part each plays, but all have a part."

The first step in the Pruett cotton operation is chopping up the old stalks. This is done with a rotary chopper; then subsoiling, done in the fall before the rains. The subsoiler the Pruetts use goes down 20 to 24 inches and splits the middle of three cotton rows. In the spring 100 lbs. of anhydrous ammonia are put in. Then a middle buster is run through the rows, rooting out the old stalks; finally the seed bed is finished with a cultipacker and a four-row section harrow, similar to the old spike tooth implement.

The cotton goes in around the first of May via four-row planters, 50,000 to 75,000 stalks to the acre. This is a much higher population than is planted on unirrigated fields. On some fields a preemergence herbacide goes down with the seed. As soon as the cotton comes up, cultivation and the eternal battle with bugs and weeds begins. The first bugs to appear are thrips, soon after the plant emerges. The thrips are given a shot of poison from four-row field sprayers. This may not be the end of thrips. Each field is checked two or three times a week and at the first indication of a fresh invasion, the sprayers go in again. There may be two or three thrip hatches, each requiring a spraying, in a season.

These checkups are very important to the cotton farmer and have a decided bearing on yield. "We keep checking," Jahue says, "and when something shows up, we go back in there." Last spring cut worms, a rather uncommon pest in cotton, got into some fields in May. Some farmers had to replant. An extremely wet season permitted grass to get a head start and the worms found the grass to their

(*Continued on page* 74)

The Pruett Brothers have six cotton pickers of various makes. Two weeks after defoliation and beginning in mid-September the pickers are in the fields for six weeks to two months.

Stan Hagen Works for Pabst

First class dairymen are made, not born.

On the Pabst Farms they are built to specification

TO MOST FOLKS the name Pabst means just one thing—beer. Actually, the name has been quite as important a hallmark to livestock breeders as it has been in the brewery world. Back in the days when horsepower meant horses, the Pabst product was delivered in drays pulled by teams of powerful, matched Percherons. Wanting the very best animals in his teams, Captain Fred Pabst, father of 87-year-old Fred Pabst, the current vice-president of Pabst Farms, Inc., imported a Percheron stallion and 29 mares from France in 1885 and established the Wauwatosa Stud. This launched the Pabst name in the field of pedigrees and testing.

The younger Fred Pabst set up the Pabst Farms, near Oconomowoc, Wisconsin, in 1906. There he continued with the breeding of Percherons and brought Hackneys and later hunters into the barns; and in 1907, just 50 years ago, the first dairy cattle were introduced with the purchase of the registered Holstein herd of O. E. Williams of Delafield, Wisconsin. From that moment Pabst and Holsteins have been as inseparable and potent a team as Pabst and beer.

There is nothing about the Pabst dairy operation that could be called fancy. There are few panel fences; most of the barns have been doing service for the last half century or so; one of the storage buildings is a converted riding arena. The farms are a commercial enterprise, which, like all such enterprises, have their economic ups and downs.

Being sellers of seed stock and semen as well as of milk, they must give their cattle a little more care than the average farmer who is in business to produce milk alone. But they do not overdo it.

"Three-times-a-day milking in our test barn is a sheer necessity," young Dave Pabst says. "It is forced upon us by our customers. They want to see three-time records and are willing to pay for them. But I think the day will come when two-time milking will be the limit. A few years back we stopped four-time milking and I wouldn't be surprised to see the three-time routine fade from the picture."

The year-in, year-out records of Pabst cows are the envy of dairymen everywhere. The average cow produces around 17,000 pounds of milk a year; all cows are expected to produce 700 pounds of butterfat a year after their first lactation and any that can not reach the 500-pound mark are dropped from the herd; the average cow stays in the milking line 10 years and, as of this summer, 44 per cent of the producers were 8 years old or older. Fifteen-year-old Pabst Burke Syna, the oldest cow in the herd, is classified "Excellent" and has produced 133,242 pounds of milk and 4,536 pounds of fat in 7 lactations on official A. R. test.

Only on very infrequent occasions are replacements brought into the herd from outside. The herd sires, too, are practically all home-bred. Some of the bulls may have been sold as calves and repurchased after they have been proven in other herds.

Like all outstanding breeding establishments, the success of this 1,400-acre layout with its 475 head of high-producing cattle is founded on perfect teamwork between the men who direct it and those who work in the barns and fields. Slim, hustling, young David Pabst is commander-in-chief of the enterprise. Sylvester, "Silver," Weiler, a veteran of more than 30 years' service, is herdsman, directing the work of an efficient barn crew of 8. Weiler's son, George, is in charge of a field crew of 5 men; and LaMar Wood directs the operations of the dairy plants at Oconomowoc and Paoli, which handle better than 320,000 pounds of milk a day during the flush season. This milk is the product of some 435 other farms besides the Pabst Farms themselves.

As herdsman Weiler scanned the farms' vacation schedules this spring he congratulated himself on the fact that every one of his crew was entitled to the full three weeks vacation with pay. A short-sighted manager might have concluded that this involved a sizeable loss of time. To Weiler it was a sure indication that he had surrounded himself with a loyal, hard-working and contented staff. It meant that every full-time man had been there a minimum of five years, an enviable record in this day of job-hopping.

How do they do it? Neither Silver Weiler nor Dave Pabst will take credit for any uncanny faculty for personnel selection. But once they take a man on they leave nothing to chance. He is given a seven-page printed set of instructions in herd management which tells him in detail what is expected of him in working with the cattle. These instructions were originally drawn up by the late Howard Clapp, Weiler's predecessor as herd manager at the farms; Silver has since revised them as necessary.

Workers on the Pabst farms are paid a regular wage plus a Christmas bonus. They have the privilege of renting a house on the place at an extremely low figure and can buy their milk from the farm at a reduced price.

Indoctrination

Stanley Hagen, a crew-cut, blond dairyman from Sparta, Wisconsin, is a good example of how Pabst produces top cowmen as well as top cows. Young Hagen is a three-time milker in the test barn on the Number 1 Farm. That is the barn where the cows on official test are milked three times a day. Three men handle the 63 cows in the barn.

But even though Hagen had spent all of his life on a dairy farm, he did not just sign on at Pabst's and start to work in the test barn.

"Five years ago I was just married," he tells it, "and I was looking for a job on a dairy farm. I had thought this would be a good place to work and get some experience, so I asked for a job and got it.

"They started me to work on the field crew. Then I moved up to become a hand-relief milker in the two-time barn, milking cows that for one reason or another can't be milked by machine. Maybe they have a low-slung udder, maybe it's an injury, but whatever it is, they have to be milked by hand and that was my job.

"Next I moved up to relief milking on the machines. And then two years ago I graduated to the three-time barn."

Hagen not only mastered the herd management instructions but fully absorbed the philosophy behind them as well, a philosophy the objective of which is "to breed an outstanding herd, superior in

Pabst Farms' top brass, Fred Pabst (left) and David Pabst (center), get a chuckle out of one of Stan Hagen's stories of life in the test barn.

production, individuality and longevity, with a reasonable percentage of butterfat and easy milking qualities."

"You know," Hagen says, "I never realized what a difference there could be in the ways to handle cows till I came here. Sure, we gave our cows plenty of care at home, but it just seems there are some things you skip or you don't get around to doing when you aren't able to specialize in your job like we do here.

"We fed good hay; here it's just a little bit better. We milked on a regular schedule, but sometimes we had to let the schedule slide for field work. We didn't mind using the same fork for hay that we used for manure. Watching those details makes a lot of difference. They are all down in the rules and they are simple enough when you get into the routine."

Dry Cows

First subject covered in the instructions is the management of dry cows. The Pabst policy is to give the cows a rest of 6 to 8 weeks between lactations to build up body reserve for milk production and the growth of the fetus. In drying-off cows the procedure is to stop feeding silage, gradually eliminate the grain from the ration, and switch to timothy or brome for the roughage. Milking is limited to once a day when the cow is milked dry and the milker is urged to "watch carefully for udder trouble." To Hagen this means to check constantly for hard quarters and mastitis. He learned that the old theory that the way to dry a cow up is just to stop milking gets no hearing at the Pabst Farms. The time for drying-off will vary, of course, from cow to cow, but on the average it takes about three weeks. "Drying-off too quickly," says Hagen, "is too hard on the udder."

As soon as a cow is dry she leaves the milking barn to make room for a fresh cow. A three-sided shed becomes her home during her dry period and, weather permitting, she has access to pasture. The instructions for feeding dry cows make a point that no good dairyman can afford to ignore:

> "It is our policy to always feed hay to cows on pasture regardless of the quality of the pasture. Feeding hay moderates the laxative effect of succulent grass and helps to prevent bloat."

Many dairymen also contend that some cows do not have the capacity to meet all their roughage requirements on pasture alone so that hay is an essential supplement at all times.

A grain ration which is "fattening, bulky, laxative and contains minerals," is also fed to the dry cows in amounts which vary according to their condition and appetite. This ration combines corn, oats, soybean oil meal, yeast, and bran, and builds up flesh without stimulating milk production before calving. And, as Hagen explains, it is just good dairy management to feed a laxative ration at all times; this type of ration also makes calving easier. The grain is not ground too finely, the feeling being that cows get more out of coarse grain.

About a week before her calf is due, the springer is separated from the herd and transferred to a roomy box stall that has been thoroughly *cleaned and disinfected*, is free from drafts, and well bedded. If the weather permits she is allowed to exercise in pasture or paddock.

About a day before calving silage is dropped entirely from her ration and the amount of grain cut in half. The grain is taken away entirely several hours before the expected delivery of the calf.

"One of our cardinal rules," Hagen says, "is that someone must be present at every calving. We always let the first-calf heifers have plenty of time except when the calf is presented backward. Orders then are to call the herdsman at once.

"After the calf is born, we clean the membrane from its nostrils, treat its navel with tincture of iodine, and lay it in front of its mother with the feet pointing away from her. We keep close watch to see that the afterbirth is expelled, reporting to the herdsman if it has not been expelled within 12 hours after the birth.

"If the calf has trouble finding a teat after it gets to its feet we guide it until it gets started; then we let it have colostrum milk for three days.

"We always keep the cow warm and comfortable after calving," Hagen continues, "to protect her from any unnecessary shock or exposure while she is in a weakened condition and while her digestive system is still working sluggishly. We give her some warm water but keep her off grain for 8 to 12 hours. Feeding grain too soon after calving can cause a hard condition in the udder."

Leaving milk in the udder helps to cut down on milk fever, so none of the cows are milked earlier than 12 hours after

Hagen puts the milker on a well-veined udder for one of the three-times-a-day milkings. The larger cows (right) are confined in box stalls. The figures on the blackboard show that this one gets 5 pounds of Pabst's regular ration plus 3 pounds of a commercial mix at each feeding.

All heifer calves are dehorned when they are two to six weeks of age. The job is usually done with an electric dehorner, although caustic is sometimes used.

calving. Heifers with their first calf may be milked dry at this time. The older cows are not milked for 24 hours and then only partially; it may be 48 hours after calving before they are milked dry.

"Milk fever," Hagen observes, "seems to be particularly hard on third-calf cows." The instructions are to call the herdsman immediately when the animal shows symptoms. The symptoms: a wry neck with the head twisted around to one side; then she will get wobbly in the hind legs and go down. An injection of 500 cc. of calcium gluconate is usually an effective remedy.

Three days after freshening the calf is removed from the cow and the cow is placed in a stanchion or a box stall, depending on her size. From that time on she is given as much hay and silage as she will eat with relish (most of the Pabst silage is corn silage) and is started back on grain at the rate of 6 pounds a day. This rate is increased not more than 1 pound per feeding; in the test barn it may go as high as 27 pounds per day; in the other barns where the cows are milked only twice a day, it never exceeds 16 pounds.

The grain ration consists of 40 pounds of oats, 20 pounds of corn, 20 pounds of soybean oil meal, 15 pounds of brewers' grains and 5 pounds of bran, making about a 17 per cent protein mixture. It is at times cut back to a 13 per cent ration by reducing the amount of brewers' grains and oats and is frequently supplemented by a ready-mixed commercial feed. One pound of mineralized salt and one pound of bone meal is added to every 100 pounds of the grain ration and ¾ pound of irradiated yeast is added to every ton. The yeast insures vitamin D intake, particularly during the winter. The cows also get some beet pulp (2 to 3 pounds per day) as a filler and conditioner.

Above every stanchion and box stall is a small blackboard, on which is chalked the feed allotment for the cow. The figures 3-3-3 on the upper line and 2-2-2 on the lower line, for example, would mean that the cow (in the test barn) gets 3 pounds of the regular grain ration and 2 pounds of the commercial mixture at each of the three feedings.

Any cow not on test producing 16 pounds of milk or less is fed no grain at all. If the price of milk is low the limit for grain feeding may be raised to 20 or even to 24 pounds of milk. Silver Weiler's rule-of-thumb is: 0.4 pounds of grain for each pound of milk over 20 pounds. But he always advises his men to adjust this rule according to the animal's condition and appetite, keeping them always "just a little bit on the hungry side."

"Over-feeding," Hagen points out, "tends to harden the udder and that's one of the things we try to avoid. Going-off feed is another thing we watch closely. All hell can break loose when a cow goes off feed. Acetonemia is one of the first things we suspect, but it may be most anything."

Nurse Cows

All Pabst calves are switched to nurse cows when they are three days old and stay on these cows for two months. This is a practice which might not prove too efficient in a small herd but which works well here where they have box stalls and adequate facilities for handling the cows and calves. The nurse cows are usually individuals which are hard to milk by machine or which have a tendency to kick. The size of the calves determines how many are kept on a cow.

The milkers are instructed to milk each nurse cow dry at each milking, morning and evening, to prevent swollen quarters from milk left by the calves. The milk production of each of these cows is estimated by figuring that each calf takes from 10 to 15 pounds a day and the amount of grain fed her is then adjusted in the same way as with the cows in the milking line, except that no nurse cow is ever given more than 6 to 8 pounds of grain per feeding, especially when she is receiving plenty of good roughage.

To determine whether or not the cow is carrying enough calves the barn crew observes the activities of the calves. If they nurse constantly, the cow is not producing enough milk and a calf will be removed. If, however, when the nurse cow is milked dry after the calves have sucked, she gives more than 4 pounds at a milking, it is an indication that she can carry another calf. Scours, too, are a definite but unwanted sign that the calves are getting too much milk.

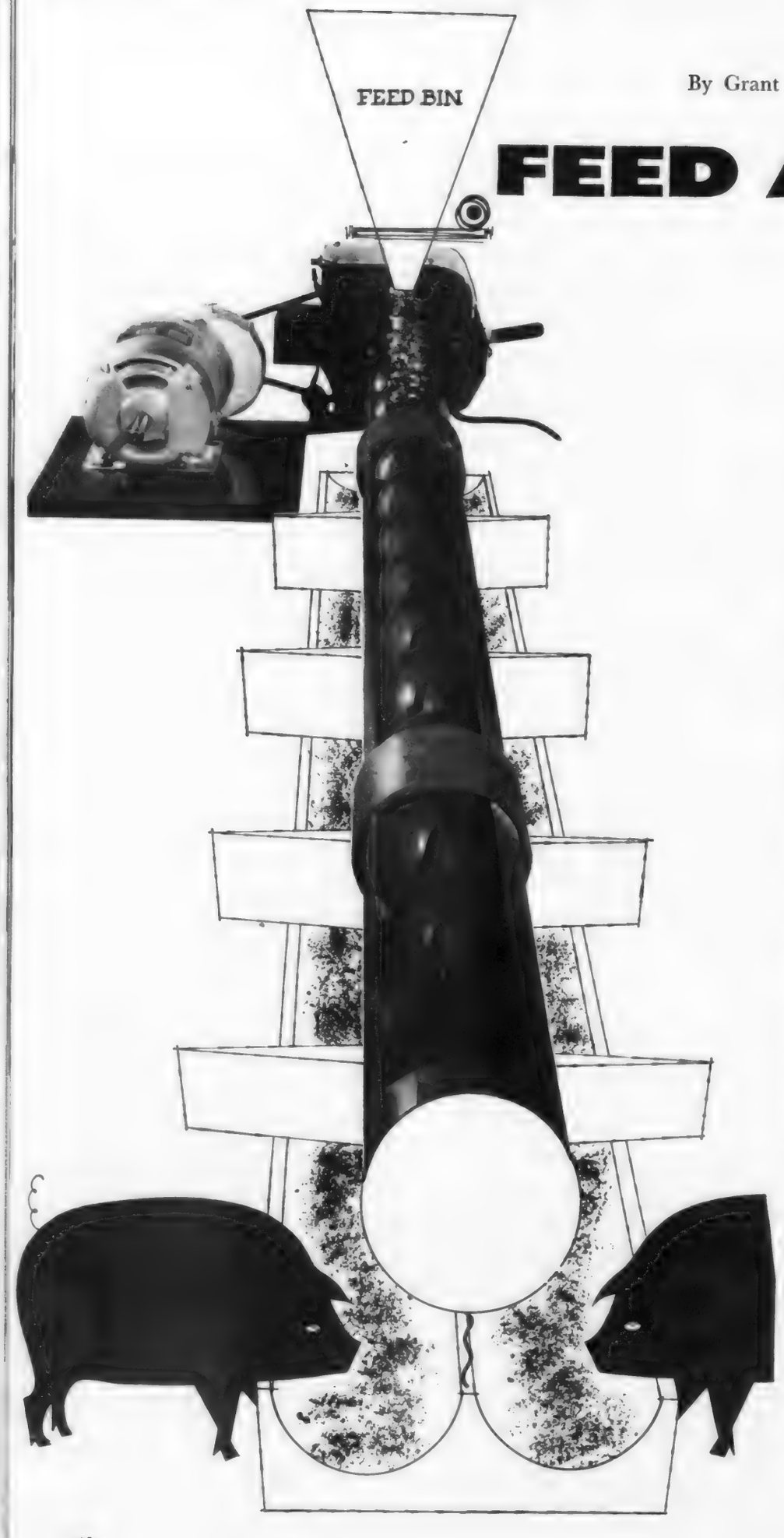
Pabst calves are introduced to grain early in life and are given the same ration as the cows from the time they are two weeks old. This grain is fed in grain pails or mangers behind closed stanchions which serve as creeps.

"Milking the nurse cows twice a day gives us a chance to detect mastitis or

(*Continued on page* 120)

By Grant Cannon

FEED A LITTLE



NEW AND MIRACULOUS growth factors that put extra pounds on steers and sheep and hogs and reduce still further the amount of feed it takes to make a pound of broiler, are now routine ingredients of feeds. These have their origin in the complex fermentation products of the rumen, in the biochemical materials that we call antibiotics, and in synthetic reproductions of animal hormones. Now we have a new one which adds more pounds on the same amount of feed. And it is so simple that it is almost unbelievable. Yet, in spite of its simplicity, no one is quite sure *why* it works.

The new method of stimulating growth involves neither drugs nor hormones nor unusual feeds. As a matter of fact it will increase the value of practically any feed. It is simply the way in which the feed is fed. For some unexplained reason, if a feed is divided and fed in eight or ten small portions throughout the day it will produce greater growth than if exactly the same amount of feed is fed in one or two massive feedings.

One of the first experiments with this new technique was performed by J. G. Gordon and D. E. Tribe at the Rowett Research Institute in England. These nutritionists took 22 Cheviot ewes—which the English call hoggs—divided them into two equal groups and started feeding. One group was fed all of its ration at 9:15 in the morning; the other group was fed exactly the same amount of feed divided into eight helpings and fed at hourly intervals. The daily ration consisted of one pound of chopped hay mixed with a pound and a half of a concentrate. The concentrate was made up of 57 pounds of corn meal (the British call it yellow maize meal), 15 pounds of crushed oats, 14 pounds of bran, 7 pounds of linseed-cake meal, and 7 of white fish meal.

After nine weeks of this experiment, the

The Winter automatic feeder will feed any amount of grain at any interval to hogs, sheep, or cattle. A timing device starts the grain from the hopper into the tube, where the auger distributes it evenly, then the tube itself rotates, dumping a load of feed. A corrugated divider directly under the falling feed separates it into two equal parts which will fall into the round troughs. Separators form individual stalls, one to a pig, to prevent feed hogging.

A LOT

Many small snacks will stretch a feed supply and put on more weight than one or two massive feedings

group that had been fed their ration in small, frequent feedings had averaged a gain of 8.7 pounds; the once-a-day fed ewes had averaged 1.7 pounds. In the frequently fed group, the greatest gain was 17 pounds and the smallest 4 pounds; in the other group the greatest gain was 7 pounds and two of the ewes lost weight—2 pounds each.

At this point the procedure was reversed, the sheep that had been getting their feed in eight parts were now fed once a day and the other group got the hourly feedings. In this half of the experiment, the slow group not only regained the ground they had lost during the first nine weeks, but passed the others. During this second nine-week period this group that was now fed frequently gained an average of 13.7 pounds while the others made an average gain of 3 pounds. The gains ran from a low of 9 to a high of 17 pounds in the frequently fed group and from a loss of 1 pound to a gain of 6 pounds in the once-a-day group.

In order to keep the experiment simple, the ration that was fed was not increased as the weight of the animals increased. The feed that remained uneaten at the end of the day was carefully weighed and recorded. Here, again, the experimenters ran into a surprise—each of the two groups left more feed in the manger during the frequent feeding period when they were gaining faster than they did when fed once a day. In other words the frequently fed "hoggs" grew faster, gained more weight, and did it all on less feed than those fed once a day.

This new idea is being tested in America, too. In Virginia, they tried much the same feeding experiment using a group of a dozen heifers as test animals and medium quality, mixed, chopped hay as the feed. For 50 days, one group—call it Group A—of six heifers was fed twice a day, at eight in the morning and again at five in the afternoon. The other group, Group B, was fed ten times a day during the same hours. The Virginians, like the English, kept the amount of feed to be fed each day the same throughout the experiment. At the end of the first 50 days, Group A was changed to 10X feedings and Group B was switched to 2X a day.

The results confirmed the finding that frequent feeding of small amounts gives better grains. During the first period Group A gained 216 pounds on 2X feeding compared to 325 pounds for Group B which was on 10X during this period. After the switch Group A climbed to a 240-pound gain during 50 days while Group B dropped to a 78-pound gain. Summarized, the gains look like this:

Experimental Groups	Treatments 2X	10X
Group A	216 lbs.	240 lbs.
Group B	78 lbs.	325 lbs.
Total	294 lbs.	565 lbs.

It may be that the rather poor showing of each group after the switch-over in feeding was due to the fact that animals are very much creatures of habit and resent change. The fact remains, however, that both groups went through the same kind of change and Group A slightly increased its rate of gain while Group B dropped off markedly.

In North Carolina, Dr. W. E. Thomas and R. D. Mochrie designed an experiment in which they attempted to eliminate any differences due to upset when the animals were changed to their new feeding schedule. For test animals they used 12 Holstein and 6 Jersey calves weighing from 241 to 587 pounds. These animals were then divided into six groups with three animals of the same breed in each group. One of each of these triplets was then fed once a day, one was fed twice a day, and the third was fed four times a day. Before the testing started all calves were fed the same test hay and grain ration once a day for four weeks, then they were put on the feeding schedule that was to be used in the test and fed for a week during a change-over period, and, finally, they were tested for six weeks.

The results were right in line with the findings in England and in neighboring Virginia. The six animals which were fed four times a day gained better than 33 per cent faster than their triplet mates which were fed fewer times a day. There was little difference between the groups fed twice and those fed once a day.

In trying to determine just why this system works, the scientists have proposed that it may be because it gives the bacteria of the rumen a better chance to work on

The English feeder uses a moving hopper to drop the feed into the trough. Pegs along the track control the amount of feed.

the feed. With limited amounts in the rumen at any one time, the bacteria can do a better job of breaking down each particle. A second attempt at an explanation was that the heavier part of the ration passed through the rumen and into the fourth compartment of the stomach more quickly and with less loss of energy through fermentation when only small amounts of feed were present. And still another explanation was based on the belief that the difference in feeding might cause different amounts of cud chewing and that this might affect the nutritional qualities of the feed. Still another speculation is that frequent feeding may simply decrease the production of heat in the animal, in which case the results secured under summer feeding conditions would be different during cold weather. It has also been observed that frequent feeding does not increase milk production—though why it does not is still just as mysterious as why it does increase weight.

All of these explanations are based on the experiments with ruminants. But what of this explanation if the same feeding techniques work well with hogs and other non-ruminants?

Very little has been done to find out how this would work with hogs. In England, a farm equipment company, D. Mc-

(*Continued on page* 113)

how to FIGURE FERTILIZER CARRY-

Fertilizer not used by one crop carries over to the next. Big applications build up fertility for ever-increasing yields

Fertilizers such as rock phosphate (above) and coarsely ground limestone may have residual effects for as long as ten years. Carry-over values of manure (right) may last as long as fifteen years. Not all commercial fertilizer is available to the crop the first year.

WHEN A FARMER applies enough fertilizer for a 100 bushel yield of corn and because of a poor season harvests only fifty bushels, what happens to half his fertilizer; when a tenant farmer decides to remove himself from a rented farm, how much value per acre can he ask from the owner for accumulated fertility he has contributed to the soil? Is it practical to fertilize once during a rotation? These questions have lacked exact answers, but soil men have recently worked out a formula which can be used as a rule of thumb for determining the residual values of fertilizer and manure.

The British Holding Act of 1900 awarded an outgoing tenant compensation for any unexhausted fertility he had brought to and left behind in the soil. For example, the tenant was paid the going price for one half the nitrogen, phosphorus, and potassium contained in any feeds purchased for fattening cattle, less one third for each year since the manure produced by feeding them had been applied to the land.

John B. Lawes, the founder of the world-famous Rothamsted Experimental Station near London, first called attention to this problem in 1870. Five years later he published a suggested compensation table. This was revised by Lawes and Gilbert, the Station chemist, and still later by Voelcker and Hall, whose tables were published in the Journal of the Royal Agricultural Society, Vol. 63, pp. 76-114, 1902. These last tables abandoned the 8-year principle adopted by Lawes and Gilbert, substituting a 4-year period as being more practicable. The compensation suggested for the second, third, and fourth years was one-half that of the year immediately preceding. These tables, with minor modifications, are still in use.

A long-time plot test of manure on barley grown continuously at Rothamsted was of considerable value to Voelcker and Hall, as were some similar tests with potatoes and grass hays. In the barley test, manure had been applied at the rate of 14 tons per

OVER

By Firman E. Bear

acre to a heavy clay loam soil from 1852 to 1871. During the next 30 years no manure was used. A fairly rapid drop in yield occurred during the years immediately following discontinuance of its use. Yet, for the last 10 years of that period, the average yield of barley on this plot was still 20.3 bushels per acre. A nearby plot that had not received any manure or fertilizer during the entire 50-year period averaged only 10.0 bushels per acre during the same period.

Thus, 30 years after the use of manure had been discontinued, the manured land was still more than twice as productive as the unmanured land alongside. The 280 tons of manure applied per acre during the original 20-year period had supplied about 70 tons of organic matter, the remainder being water. This organic matter carried not only nitrogen, phosphorus, and potassium, but all the other elements contained in the feed of the animals producing the manure.

Would similar long-time effects have been observed if fertilizers had been used instead? Justus von Liebig, the inventor of fertilizers, made two highly significant statements bearing on this point when he addressed the British Association for the Advancement of Science in 1840. One was that plants are the *only* producers of organic matter. The other was that the amount of organic matter plants produce can be greatly increased by applying chemical fertilizers to the soil on which they are being grown.

A century's research and experience since that date have proven the dependability of both these statements. And it naturally follows that the larger the amount of plant produce per acre the greater the quantity of organic refuse left behind, on and in the soil of that acre after the crops have been harvested and hauled away. This means that you do not have to haul organic matter to the field. You can grow it there.

The same year the Holding Act was passed a very important plot test was started at the West Virginia Agricultural Experiment Station. During the next 15 years, 5 tons of 7-7-7 fertilizer per acre was applied to one of these plots. It consisted of a mixture of nitrate of soda, superphosphate, and muriate of potash, and contained no organic matter. The plots were planted to cultivated crops, small grains, and legume-grass hay crops, grown in rotation. The soil was a Dekalb loam.

The oven-dry weight of produce harvested and removed from the fertilized plot during the 15-year period totaled 117,910 pounds per acre. The nearby check plot yielded only 40,960 pounds dry matter per acre. Analysis of the soil at the end of the test showed 60,800 pounds of humus per acre to plow depth in the fertilized plot and 42,800 pounds in the check plot. This means that the fertilizer not only multiplied crop yields nearly 3 times, but that these larger crops left enough more organic

(*Continued on page* 96)

Soil Improvement Index Values

The Carry-over Effects of Fertilization and Crop Residues on Fertility

Crop	Value
Corn and other cultivated crops	−2.00
Small grains	−1.00
Soybeans, straw removed	−0.50
Straws and stalks left on land	+0.25
Alfalfa, first year	+2.50
second year	+0.50
third year	0.00
Timothy and other grass sods	0.00
Clover—timothy hay or pasture	+1.00
Clover, hay or pasture	+2.00
Sweet clover plowed under	+2.50

Soil Treatment	Value
Each ton of protected manure	+0.15
Each 200 pounds of fertilizer	+0.15

Erosion Factor*

Erosion Degree	No Control	Contour Farmed	Strip Cropped
None	0.00	0.000	0.000
Slight	0.25	0.125	0.050
Moderate	0.50	0.330	0.125
Severe	1.00	0.800	0.300

*All negative values are increased by the amount obtained by multiplying them by these factors.

This table explains how a rotation of crops maintains fertility. Its use will permit a farmer to plan his crops and his rotation and give him a rule-of-thumb to follow in supplemental use of fertilizer and manure. This is how it works: Let us suppose that his rotation is corn-wheat-alfalfa-alfalfa. The corn crop will take out 2.00 units of fertility, the wheat crop 1.00, a total of minus 3.00; the first year of alfalfa will add 2.50 units and the second year .50; a total of plus 3.00. He has maintained the fertility of his fields provided he has lost nothing from erosion. If he has severe erosion but he strip crops and contours, his loss to this factor will be only .30. If he allows straw and stalks to remain on the land, he gains .25. Take another example: If he has a rotation of corn-soybeans-timothy and clover, the corn will take out 2.50, the soybeans will take out .50, and the timothy and clover meadow will add 1.00. He has a net loss of 2.00. This must be supplied by fertilizer or manure. He can add these, at the rate of .15 for each ton of manure and 200 pounds of fertilizer, to bring fertility back to par.

If more fertilizer, manure, or crop residues are added than are taken out of the soil, the residue carries over to the next crop, less, of course, small amounts of phosphates and potash lost by leaching. Nitrogen does not carry over in appreciable amounts, being used by residues and becomes available later as the residues decay.

THYROPROTEIN

The USDA says hormone feeding is a waste of time, but dairymen report getting 15 to 25 per cent more milk with it

IN THE FIELD of animal feeds and nutrition there has been a revolution: antibiotics for hogs; stilbestrol for beef cattle; thyroprotein for dairy cattle. The pay-off on each of them has been increased production of the particular meat or milk that the animal produces, at a lower cost per unit.

The modest professor at the University of Missouri, Dr. Charles W. Turner, who was responsible for much of the development work on the latter two—stilbestrol and thyroprotein—had long ago proved their value by controlled tests and was amazed at how long it took for each to become widely used on farms. Dr. Turner, it should be added, is professor of dairy husbandry at Missouri and one of the top men in the field of hormones and the physiology and anatomy of the animal mammary glands.

With revolutions come fire and smoke and these three new developments have had their share of both, along with a barrage of words, pro and con. In examining thyroprotein feeding we find that a number of experiment stations have lined up with the pros after conducting feeding and production research. At least one station, Montana, has come out on the other side of the fence. Thus we have a variety of opinions on the question, just as we have had in the past on crossbred cows, urea feeding, and other new ideas. To add confusion to the whole picture, the USDA has released a lot of old and some new information which has been widely reprinted in state extension publications.

The proof of the value of thyroprotein, like every other feed development, is whether the farmer can increase his milk production to pipe some extra dollars into his bank account. And in the great dairy areas of Wisconsin and Minnesota, dairy farmers have come up with some milk and butterfat production gains that have made them willing and anxious to keep right on feeding it, at 16 cents a pound, a day's quota for a cow.

Before we stop by the farms of some of these dairymen, a few of whose faces are shown on this page, let's ask some questions and let the best informed man on the subject answer them. These are the questions we asked Dr. C. W. Turner, and the answers he gave.

Who did the first work on the thyroid hormone, which we know is important to health, growth, and milk production in animals?

"The early work was done by Dr. W. R. Graham, Jr., at the experiment station at the University of Toronto, Ontario. This was about 23 years ago. When he removed the thyroid glands from milk cows he found that their milk production went down materially. When he fed the desiccated natural thyroid hormone to these cows, their milk came back. But the important thing was that when he fed the desiccated hormone to normal milk cows, their milk production was increased. He did further work on dairy cows in England with Dr. H. D. Kay, director of the National Institute for Dairy Research in Reading, England, with the crystalline form of the hormone, called thyroxine. On a Rockefeller Fellowship he came to the University of Missouri where he worked with me and Dr. Harry Herman. At that time, the hormone was expensive and the idea of feeding it would not have been practical, cost-wise.

"In the next few years, Dr. E. P. Reineke and I worked out the development of a synthetic thyroid hormone which has since been named 'thyroprotein.' It is cheap enough to feed."

Where are the thyroid glands?

"In cows, or in you and me, they are on each side of the windpipe. They are two lobes connected by an isthmus. A good milk animal has a high secretion rate of the thyroid hormone from these glands for her body weight. A poor milker has a low rate."

How does the thyroid gland function?

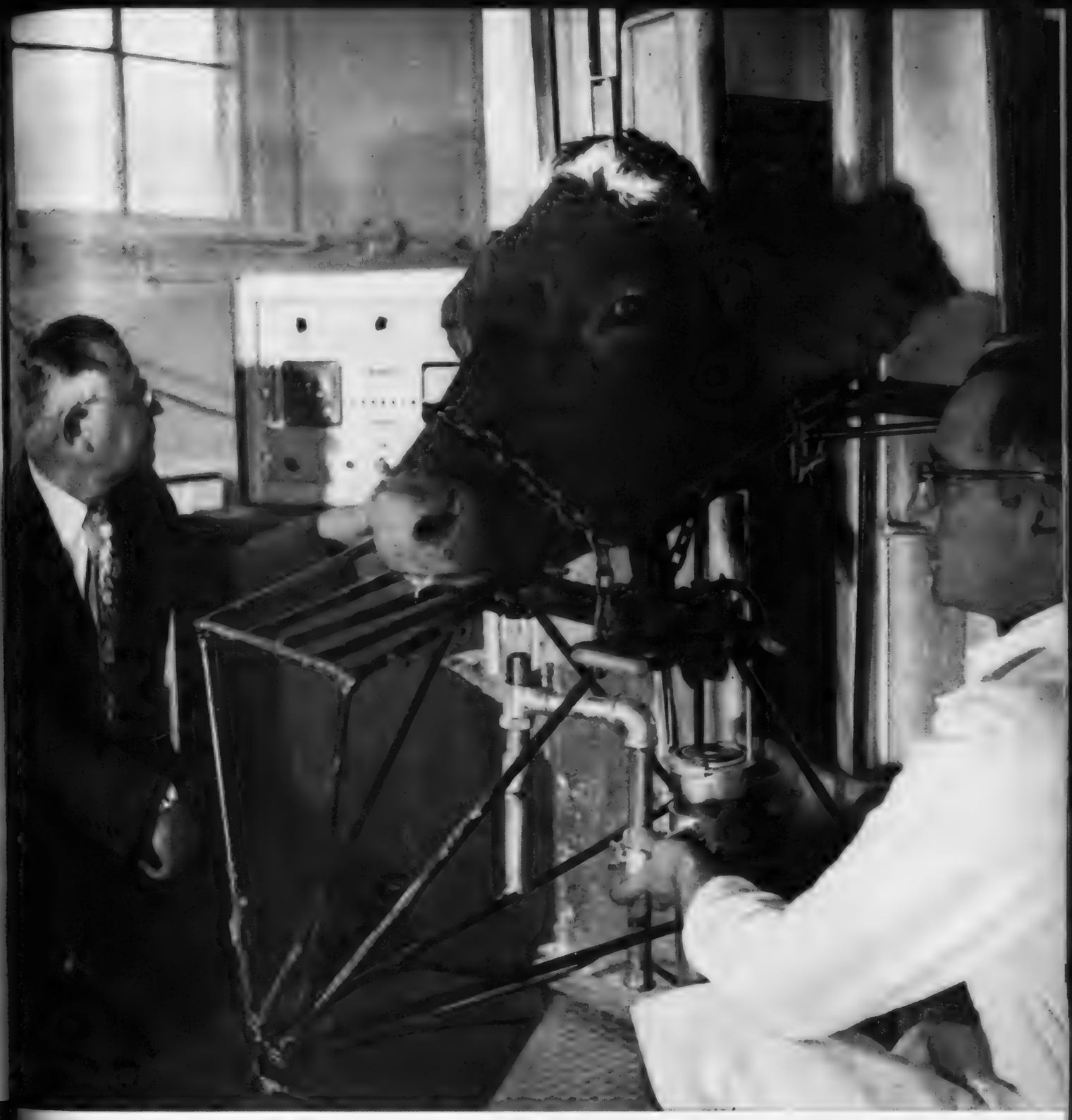
"It picks up iodine from the blood and it iodinates a protein of the thyroid gland, globulin, to form thyroglobulin. That is a big protein molecule but the actual hormone is only one part of it, one amino acid called thyroxine.

"The process that we have developed in the laboratory makes synthetic thyroxine, the same substance. The only difference is that the basis of our substance is casein instead of blood globulin. What we are producing is the same hormone that a milk animal produces."

How does the hormone, thyroxine, work to produce milk?

"There are variations in the normal secretion rate of the thyroid hormone in

Francis Foucks (above) a Wisconsin dairyman who started feeding thyroprotein late in the spring, added $300 to his milk checks in 96 days. Right, Bernard, who is fifteen, helps milk the cows on the Standaert farm. Their records showed a 20 per cent milk increase and .3 higher butterfat. Extreme right, Melvin Heibel of Clear Lake, Wisconsin, said the extra milk he got from hormone feeding was like adding 3 cows to his herd of 34 milkers.



This is the new laboratory method for checking the relationship between the amount of milk a cow gives and her thyroid hormone secretion rate. Dr. Charles W. Turner and Dr. Gail W. Pipes, of the Dairy Husbandry Department of the University of Missouri, are using a Geiger counter and computer on the Guernsey cow in the photograph above. By feeding varying small amounts of radioactive iodine to the cow, a direct measure of the hormone discharge into the blood can be computed. This method can be used to determine the optimal amount of hormone feeding a cow should be given to increase her milk flow. The radioactive effect lasts for about 8 days and the milk is discarded.

various animals. With the feeding of thyroprotein, we are bringing the amount of the hormone, thyroxine, up to the optimal level needed for an animal to produce her best milk flow. If you are breeding to produce good milk cows, one of the things you are doing is producing cows that have high thyroid hormone secretion rates. The problem of fine, healthy dairy cows that don't give much milk is still with us, though. An animal may have wonderful show points, let's say, but her thyroid hormone secretion rate is low and so is her milk production. When you feed the right amount of the thyroid hormone to her it goes into her bloodstream to supply the optimal amount for this cow for her weight and she will produce much more milk and butterfat. The action of thyroid hormone is to speed up the metabolism of the cow, causing her to work harder at the job at hand—producing milk. It will not change her permanently, but as long as you supply the hormone she will respond by giving more milk and butterfat. We have proved this fact by research as have many other experiment

(*Continued on page* 127)

By Bob Rankin

SORGHUM TIME

The juice flows from the crushed cane into a barrel covered with a burlap strainer. The mules make a meal off the crushed cane and the juice flows into the boiling-off pan at one end, comes out the other as a thick, dark brown syrup, just the thing for hot cakes and corn bread and for seasoning baked beans.

WHEN THE SQUIRRELS get busy in the hickory groves and the first frosts have taken the pucker out of the persimmons, it's sorghum molasses time in the hills of Tennessee and Kentucky and Missouri.

Sorghum will grow as far north as the Canadian border and it thrives as far south as the Gulf, but its greatest devotees are the hill people of Kentucky, Missouri, and Tennessee.

Until a few years ago, sorghum meant sorghum molasses, squeezed from a tall plant that looks much like a stalk of corn wearing a turban. The boiled-down juice produces a sweet, rich syrup with a rasp to it. But with the advent of dwarfed grain varieties and the leafier pasture sorghums and the succulent silage types, the Department of Agriculture changed the name of the syrup sorghum to sorgo to distinguish it from its cousins, the Kafirs, Milos, Kaoliangs, Johnson and Sudan grasses. And among the drouth-resistant, hardy sorgos are a fine choice of varieties —Folger, Red X, McLean, Sapling, Sugar Drip, White African, Sumac, Honey, and Gooseneck.

Like corn growers, who prefer to market their corn in the more profitable form of beef and hogs, sorgo raisers like to turn their cane into rich amber syrup on their own place rather than sell their cane to a commercial plant and let the syrup profit go.

Marvin Potter, who farms in the hilly country near Cottle, which is in the feuding section of Kentucky, is one of these. With his sorghum mill and the copper cooking pans that were his father's and his grandfather's and his great-grandfather's, he makes more from his two acres of rich bottom land planted to sorgo than he does on his tobacco allotment. More? Most years he makes double what his tobacco brings.

He figures his return on what he sells and doesn't count the supply kept by the family. And he doesn't count the leaves, stripped off to improve the syrup quality and saved for cattle fodder, or the seed head that is fed to the chickens.

In the spring and summer, Potter plants and cultivates his sorgo like corn, but in October comes the cook-off, which is as different from corn harvesting as maple sap collecting is from lumbering. On a fine October morning, Marv Potter with his wife and five-year-old Jackie riding the mule, Lightning, and the two girls on his mate, Thunder, and the boys following, head across the hills for the cane field.

By the time Marv has the long cooking pan with its many dividers set up on rocks and a fire going under it and has hitched Lightning to the end of the long sapling which is used as a sweep to power the primitive burr mill, the two bigger boys, Bill and Little Marv, have a pile of cane cut and ready to be crushed.

The mule is started on his endless walk around and around the mill while Marv feeds in the first canes. Every time the mule passes, Marv ducks under the sweep. Sometimes he fails to duck soon enough, and gets a lump on his head, or loses his old Army fatigue cap. When Lightning gets dizzy from walking the merry-go-round path, Thunder is hitched to the pole to spell him off.

As the cane is mashed in the big wringer, a driblet of juice runs down the rollers and out of the mill in the trough. From the trough the juice runs through a screen and a square of freshly laundered burlap, set up to catch cane fibers and other trash, and then on into a catching barrel.

As Marv feeds in the stalks, the trickle of juice becomes a rivulet and the barrel fills. Through a pipe in the barrel bottom, the strained juice flows into the starting end of the cooking pan and the boiling begins. The boiling juices begin to foam and the foam rises to the surface, carrying impurities with it. As the foam and impurities are skimmed away, the muddy-looking juice can be seen boiling sullenly below. As the juice is paddled up the divided pan to the finishing end, the color changes to a swamp green, then to a muddy brown, and finally, when it is done, to a golden brown as clear as an amber bead. Mrs. Potter usually handles the paddle that guides the juice from the starting end to the finishing end; she joins Marv at all of the jobs and with him decides when to draw off the finished syrup by pulling a plug and draining it into a barrel. In its slow progress from the starting end to the finishing end, the juice becomes thicker and sweeter. With fresh juice flowing in one end and finished syrup coming out the other at a ratio of one gallon of syrup to four gallons of juice, they have a perfect, continuous-process, manufacturing method here.

One of the girls usually handles the skimmer, a dipper tied to a hickory stick. The foam is carefully skimmed and tossed into a "skimming hole" which has been dug near the fire. During big run-offs of sorghum, this hole may be several feet deep and as wide as a sewer manhole. The kids like Marv's story of how, when he was a boy, a cousin pushed him into a skimming hole, "clear up to my shoulders and I had to wash off, clothes and all, in the crick to get shed of the sticky stuff. It was downright chilly that year and I got right crisp before my clothes dried out."

At noon, the reluctant mule is unhooked and led over to a lunch of crushed stalks (called pumice or pomace by most Kentuckians and bagassa further south). Sorgo stalks are not considered a balanced diet by animal nutritionists, but the uneducated mule thinks they're very nice. The family fares better. A pressure cooker has been kept hot on the edge of the fire since morning. Mrs. Potter lifts the lid and the smell of rich stew mingles with the tang of boiling sorghum.

During the noon period the family sit along the banks of the creek with plates of stew and home-made bread, slowly eating their lunch and relaxing. Occasionally, Mrs. Potter or Marv gets up to look at the syrup, boiling over the fire that has been allowed to die down.

From the highway, the steam and smoke, which can be seen drifting up from the thicket, may attract a passing driver who stops to buy a jug of syrup. "Why they generally pick noon to stop is a mystery," Mrs. Potter says, "except maybe they hope for an invite for lunch. And I've put out lots of free meals that way."

Most of the syrup is sold at $2.50 a gallon at a roadside stand the family operates; a surprising amount they keep for their own use; and the left-over that isn't sold retail is sent to the city to go into bakery-made brown breads, cookies, and cakes. The two acres of sorgo bring in around $900 a year in cash.

In the old days, the last run-off of molasses was celebrated by a covered-dish supper. Neighbors and friends came from far and near. Everyone dipped a cane into the cooking foam to appraise the flavor of the syrup. Sometimes there was a dance, to fiddle and guitar, and almost always a jug of moon hidden in the pumice pile.

There was always a good deal of courtin' going on at a boiling-off, some serious, some just extemporaneous and temporary. Everything was right—the harvest moon, the soft guitar music, and the sweetness that came from the molasses jugs. Many a troth was plighted and many a bond sealed with lips sticky sweet from sorghum molasses—in the fall of the year at boiling-off time.

Those were the good old days, the Potters say. But they're just as happy, today, when the sorghum is off. There's folding money for the winter and a row of jugs in the basement each filled with golden brown molasses for the hot cakes and the cornbread.

A Motor is a hired hand that never quits

For 5 cents a day it will feed corn to the hogs

For 10 cents a day it will pump the farm's water

It provides year-'round, quick-start power

By O. E. Benanchietti

All About Motors

TODAY EVERY PROGRESSIVE FARMER is a businessman running a food production factory. Like any businessman, he tries to overcome the cost of labor with machinery.

When we look around any farm we see electric motors driving all types of elevators, hoists, grinders, feed mills, mixers, silo unloaders, bunk feeders, conveyors, wagon unloaders, barn and gutter cleaners, crop driers, hay driers, pumps, irrigation systems, fans, and milking machines. The accepted applications for electric motors on farms have increased at least 1000 per cent in the past 10 years and they are still increasing with farm automation.

Getting the most out of a motor involves taking time for careful planning. The farmer must first select the motor suited for his *climatic* conditions and load. He must connect the motor to his equipment correctly so he will get continuous, trouble-free operation. He must provide the proper wire size and controls when he hooks up the motor. Service, such as cleaning, lubrication, and inspection, will give a long life and keep operating costs and repairs down.

This article will detail the facts of life for electric motor selection and application to help the farmer obtain many years of low-cost dependable power for farm jobs.

Today most farms use single-phase motors; the load is not yet great enough to justify the construction of 3-phase lines in many rural areas.

Let's take a look at each of the motors which are most commonly used on farms. There are several different types, each having individual features that determine its performance characteristics. Most farm jobs use these types of electric motors:

(1) Resistance split phase
(2) Capacitor start induction run
(3) Capacitor start capacitor run
(4) Repulsion start induction run

The resistance split phase motor is widely used for equipment requiring constant

GUIDE FOR FARM MOTOR SELECTION

Type Equipment	Motor Size H. P.	Type Motor	Motor Enclosure
POULTRY HOUSE			
Automatic Feed	¼ to ½	Split phase or Cap. St IR	Totally enclosed or drip proof
Small Elevator	½ to 1½	Cap. St IR	
Conveyors	½ to ¾	Cap. St IR	
Litter Stirrer	¼ to ½	Cap. St IR	
Vent Fan	up to ½	Shaded pole or Split phase	
MILKING PARLOR AND DAIRY BARN:			
Portable Milker	½	Cap. St IR	Standard drip proof protected
Pipe Line	½ to ¾	Cap. St IR	
Cream Separator	¼ to ½	Cap. St IR	
Immersion or Tank Type	¾ to 1 for compressor—¼ agitator	Cap. St HT or RI	
Side Opening Spring Type Milk Cooler	½ to 3	Cap. St IR HT or RI	
Bulk Milk Tank Cooler	½ to 2	Cap. St, Cap. Run or RI	
BARN CLEANERS, SILO UNLOADERS, AND BUNK FEEDERS:			
BARN CLEANERS:			
Drum with Loading Conveyor	½ to 1	Cap. St IR HT or Cap. St, Cap. Run or RI	Drip proof
Endless Chain, including Loader	1½ to 5		
Endless Chain, with Hopper Elevator	1½ to 5		
Reciprocating with Loading Conveyor	1½ to 5		
Scraper Type, with Endless Chain	¾ to 3		
SILO UNLOADER:			
Top Unloader	2 to 5	Cap. St IR HT or Cap. St, Cap. Run or RI	Totally enclosed or drip proof
Bottom Unloader	3 or 5		
BUNK FEEDER	¾ to 3	Standard gen. purpose Cap. St IR	Drip proof
FARM WORKSHOP:			
Grinder	½ to ¾	Cap. St IR	Standard drip proof
Drill Press Max. Drill Size (in.) ¼ or ½ or ¾ or 1 or	¼ ½ ¾ 1		
Saws: Circular, Rip and Crosscut	½ to 3		
Air Compressors	½ to 2		
Concrete Mixer	½ to 3		

Type Equipment	Motor Size H. P.	Type Motor	Motor Enclosure
FARM WATER SUPPLY:			
Shallow Wells	½ to ½	Split phase or Cap. St IR	Open drip proof
Deep Wells	½ to 2	Cap. St IR	
Deep and Shallow Well Jet Pumps	½ to 2	Split phase or Cap. St IR	
HAY AND GRAIN HANDLING AND DRYING:			
Hay Hoists	3 to 7½	Cap. St IR Cap. St, Cap. Run or RI	Standard open drip proof
DRYING GRAIN OR HAY:			
Heated Air Drying System	3 to 15	Cap. St IR	Standard open drip proof
Straight Air Drying System	1 to 5		
Aeration System	½ to 1½		
ELEVATORS:			
Bucket	½ to 2	Cap. St IR Cap. St, Cap. Run or RI	Standard open drip proof
Auger	½ to 5		
Blowers	1½ to 7½		
Silo Fillers	3 to 7½		
ENSILAGE CUTTERS AND FEED GRINDERS:			
ENSILAGE CUTTER:			
Flywheel	3 to 7½	Cap. St IR Cap. St, Cap. Run or RI	Enclosed
Hylinder	3 to 7½		
FEED GRINDER:			
Hammermill	1 to 7½	Cap. type gear	Enclosed
Burr Mill	1 to 5	Cap. type gear	Enclosed
Feed Mixer	1 to 7½	Cap. St IR	Drip proof or enclosed
Roller Type Crusher	1 to 7½	Cap. St IR	Drip proof or enclosed

KEY:

Capacitor=Cap. — High Torque=HT

Alternating Current=AC — Repulsion Induction=RI

Induction Run=IR

H. P. and motor enclosures as shown on typical farm applications are the most commonly encountered. For specific machinery refer to original equipment manufacturers' recommendations.

speed on which the starting load is light to medium. It consists of a squirrel cage rotor and a stator in which are found two different sets of windings. One is called the running winding and the other the starting winding. The starting winding is usually of higher resistance wire and has fewer turns of wire and is 90 electrical degrees displaced from the running winding. When the current is turned on a centrifugal switch is closed which allows the current to flow through both windings. The current which flows through the motor windings produces a rotating magnetic field which develops a twisting force known as starting torque. The rotor commences to turn and when it reaches about 75 per cent of rated speed, the centrifugal switch opens to disconnect the start windings from the circuit. Then the motor runs on the main winding. The main characteristic of this motor is that it draws a large amount of current when starting for the small amount of starting torque, or twist, it produces. This high starting current limits its use to ½ horsepower and smaller motors. The direction of rotation of the motor can be reversed by interchanging the leads of the starting winding.

Capacitor Motors

The modern capacitor motor can be designed for any type of duty or load. Two basic designs are used to obtain the various characteristics required for present-day farm equipment; they are the capacitor start induction run and capacitor start capacitor run. These constant speed motors are widely used for equipment in which the starting load is heavy. The capacitor start induction run motor is similar to the split phase motor in that both have squirrel cage rotors and two separate windings, a starting and running winding. In addition, this design employs a capacitor which increases the phase angle and serves as an electrical storage reservoir that provides the starting winding with an extra

(*Continued on page* 54)

CHARACTERISTICS OF PRINCIPAL TYPES

1/10 to 1/3	Constant	Med.	High	High	Cent. Switch
1/6 to 1/4	Constant	High	High	High	Cent. Switch
1/8 to 1	Constant	Med.	High	High	Cent. Switch
1/8 to 10	Constant	High	High	High	Cent. Switch or Voltage Relay
1 to 10	Constant	High	High	High	Cent. Switch or Voltage Relay
3/4 to 15	Constant	High	High	High	Cent. Switch or Voltage Relay
3/4 to 15	Varying to Constant	Very High	Med.	High	(2)

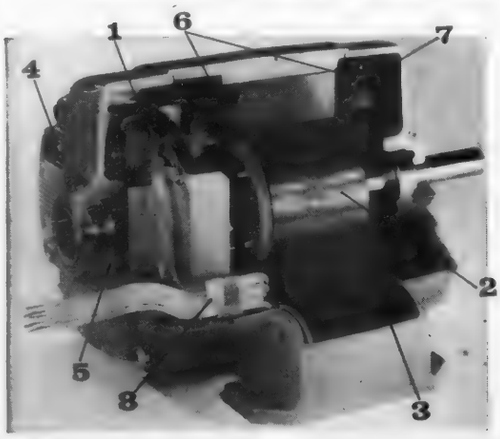
(1) This general comparison of construction and characteristics should be used only as a general guide. Performance characteristics may vary considerably depending upon the motor manufacturer and the specific rating of motors.

(2) Cent. mechanism operates push rods which lift brushes from commutator or design centrifugal mechanism merely short currents commutator. Does not lift brushes.

Capacitor Motor Construction Features

1. Centrifugal starting mechanism and transfer switch—As motor accelerates centrifugal force pulls the starting mechanism in, which releases the transfer switch changing the motor winding from starting to running conditions. This mechanism has no moving rods or pins to wear out.

The transfer switch is a simple, sturdy switch of either enclosed or open construction. These switches have been designed so that even in constant start-stop service it will normally last the life of the motor.



2. Solid-cast rotor windings and fan—A practically indestructible rotor, with low inertia, is the result of a one-piece cast-aluminum construction. Fans are integrally cast with end rings. Rotor and stator laminations are precision punched, carefully assembled, and annealed to insure low iron losses and uniform performance.

3. Protected capacitors—In this motor the capacitors are located in the base. Other manufacturers choose to mount them in the opposite pulley case shield, on top of motor or in oversized conduit boxes. In all cases, protection against physical damage is the main consideration.

4. Nameplate with specifications located near conduit box. Here conduit box is an integral part of endshield, therefore nameplate located on opposite pulley end shield. Other manufacturers who provide conduit boxes on motor frame have nameplate above box on stator frame. Connection diagrams are either on the nameplate or on back of conduit box covers.

5. Typical designed bearing housings. Bearing housing effectively seals dirt out and grease in. Single sealed or shielded bearings with a slinger are normally furnished. Slinger is also effective on a pull washer. On the outside a long, close-running fit along the shaft effectively seals the bearing. This type and similar types are engineered to take full advantage of revolutionary new greases which make possible much less frequent greasing. Provisions for regreasing are supplied.

6. Stator windings. Stator coils are normally random wound with an excellent insulated magnet wire which provides uniformly high dielectric film throughout the manufacturing processes of winding, varnishing, and baking. It also maintains it under advance operating conditions. After winding, the stator is dipped in proper insulation varnish and baked to provide a tough, compact protective cover for the windings.

7. Phase and slot insulation can be of varnished cambric, polyester films or other material which provide strength dielectrically, mechanical toughness, high resistance to moisture, and long life.

8. Leads are always numbered for easy identification. This is normally accomplished by perma-numbered leads, metal bands on number terminals.

OF SINGLE-PHASE MOTORS USED ON FARMS (1)

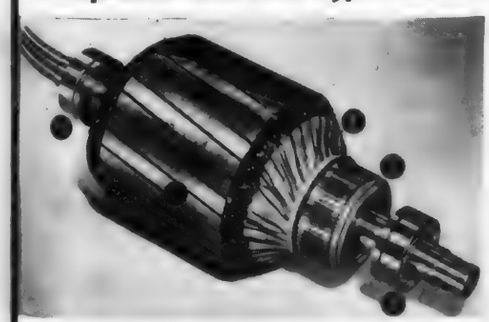
Yes (3)	No	Fair	Fair	None	High	Squirrel Cage	Fans, blowers, small unloader conveyors, grain and seed cleaners, pumps, vegetable peelers, meat grinders—recommended for applications having low starting torque requirements where starting is infrequent. Designed to operate at rated horsepower and have no overload capacities.
Yes (3)	No	Fair to Good	Good	None	Medium	Squirrel Cage	Blowers, sump pumps, saws, grinders, workshop tools, small wagon unloaders, mixers, conveyors and elevators, agitators. Designed primarily for application which have moderate starting torque requirements. Standard overloads apply.
Yes	No (5)	Fair to Good	Good	None	Medium	Squirrel Cage	This motor is normally designed for reduced starting torque at rated horsepower. Generally designed with no overload capacities. Normally used on light duty applicatons such as fans, blowers,pumps, saws.
Yes (3)	No (5)	Good	Good	None	Medium	Squirrel Cage	Grinders, blowers, sump pumps, saws, grinders and bunk feeders, air compressors, corn shellers, feed mixers, hammermills, conveyors, elevators, fans, crop driers, water pumps, irrigation pumps, etc. Designed to fulfill the requirements of 90% of all single phase applications.
Yes (3)	No	Very Good	Good	None	Medium	Squirrel Cage	Silo unloaders, barn cleaners, refrigeration compressors, bulk milk tank compressors. Primarily designed for heavy-duty applications. This motor is generally interchangeable with comparable three phase ratings and recommended for any continuous operated machines.
Yes (3)	No	Excellent	Excellent	None	Medium to Low	Squirrel Cage	Used on same application as the capacitor start, induction run high torque motor. Generally designed for heavy-duty application and to meet low starting current requirements.
Yes (4)	No	Good	Good	Yes, During Starting	Low	Wound Armature and Commutator	Same application as the capacitor start induction run high torque motor. Designed for heavy-duty applications and to meet low starting current requirements.

(3) Change connection.

(4) Requires mechanical shifting of brushes.

(5) Instantly reversible single pole motors are offered by some motor manufacturers for special application.

Repulsion Induction Type Motor Construction



1. Commutator consists of copper bars, which extend out to form a pocket for the shorting ring. The shorting ring has many small segments which are held by a spring placed over them. This ring is held in place by a snap ring on the shaft. When the motor reaches a certain speed, centrifugal force throws these segments out shorting the commutator and henceforth the motor runs as an induction motor.

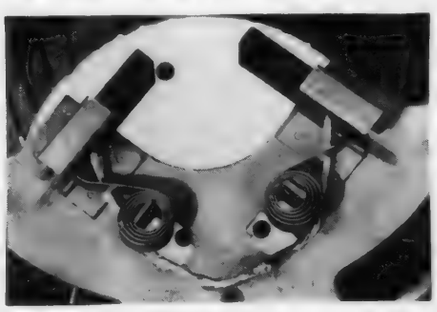
2. The rotor core is normally held on the shaft by a press fit. The punchings are open slot construction and skewed. The rotor is normally balanced by pressing weights into the slot openings. The length of rotor core depends upon the horsepower rating of the motor.

3. Bearings are normally single shield or single sealed ball bearings. They are usually pressed on the shaft with a slinger or pull washer provided behind each bearing.

4. Rotors are wound with normal DC type winding—Rotor insulation similar to stator.

5. The motor can be reversed by the mechanical shifting of brushes. Depending on motor construction this brush shifting may or may not require the removal of the opposite pulley endshield.

6 & 7. Brushes are connected together in pairs by a pigtail and make contact with the commutator during the entire operation of the motor. Pressure is kept on the brushes by springs located on the side of the brush holders.



How To Select Irrigation Motors

Where the right current is available at the right price, an electric motor driven pump is a clean, inexpensive, and trouble-free method of hoisting the water out of the ground.

The initial costs of electric motors are comparable to other drives. And because a motor has few moving parts—two bearings and one rotor—its big advantage is low maintenance cost and expense.

Selecting the proper motor for an irrigation well involves these steps, to match the motor to the needs of the well and to the available electric power supply.

1. THE HORSEPOWER required for an irrigation pump depends on the depth of the well and the quantity of water which must be pumped. To determine horsepower, first select the theoretical horsepower of the motor on table No. 1 below, based on the required volume of water and the feet of head. This table gives the requirements for discharging the well water into a gravity system. The additional horsepower requirements for a sprinkler system will depend on the pressure requirements of the individual system; one reason you should call on an engineer to help plan it. Since no pump is 100 per cent efficient, the actual motor horsepower must be greater than the theoretical horsepower to make up for friction losses. To determine actual motor horsepower, use this formula:

$$\frac{\text{Theoretical horsepower}}{\text{Pump Efficiency}} = \text{Actual horsepower}$$

2. SPEED. Electric motors are available with different operating speeds. The most popular is an 1800 RPM model. However, since some pumps operate at other speeds, you should check your pump dealer or manufacturer to determine speed needed for your pump.

3. FRAME SIZE. Be sure to check the motor frame size so the motor mounting holes match the corresponding mounting holes on the pump discharge head.

4. It is essential to match the motor to the available power source. For small motors, the supplier will bring in single-phase, 60 cycle, 230-volt. For larger motors, he will furnish 3-phase, 60 cycle, 220 or 440 volt power.

The pump shaft is connected to the vertical motor shaft by means of a coupling in the top end of the motor. And the type of coupling depends upon the type of pump. The two types of couplings which are in general use are the self-release and non-reverse. The self-release coupling is the most common type used. It protects the equipment from damage which might be caused by an accidental reversal of the motor. In this case, the line shaft would start to unscrew. This action lifts the top half of the self-release coupling free from the driving bolts and disconnects the pump from the motor.

A non-reverse coupling is the type which prevents reverse rotation of the motor. It is recommended for pumps with water-lubricated line shaft bearings which can be damaged by turning when the water has dropped from each bearing. Without this protection, the bearings might be damaged each time the motor stops.

Table 1: Theoretical Horsepower Required for Different Pumping Conditions

Gal. Per Min.	25 Feet	50 Feet	100 Feet	150 Feet	200 Feet	300 Feet
25	0.16	0.31	0.62	0.94	1.25	1.87
50	0.31	0.62	1.25	1.87	2.50	3.75
75	0.47	0.94	1.87	2.81	3.75	5.62
100	0.63	1.25	2.50	3.75	5.00	7.50
150	0.94	1.87	3.75	5.62	7.50	11.38
200	1.25	2.50	5.00	7.50	10.00	15.00
300	1.88	3.75	7.50	11.38	15.00	22.50
400	2.50	5.00	10.00	15.00	20.00	30.00
500	3.13	6.25	12.50	18.80	25.00	37.50
600	3.80	7.60	15.20	22.80	30.40	45.60
800	5.05	10.10	20.20	30.40	40.50	60.70
1000	6.25	12.50	25.00	37.50	50.00	75.00
1500	9.37	18.70	37.50	56.20	75.00	112.00
2000	12.50	25.00	50.00	75.00	100.00	150.00
2500	15.60	31.20	62.00	94.00	125.00	187.00

surge of current at the proper time. This enables the motor to develop greater starting and accelerating torque for the same amount of total starting current. The motor starts on both windings and as the motor comes up to speed, a centrifugal switch or voltage relay cuts the starting winding and capacitor out of the circuit at approximately 75 per cent speed. The motor then runs on the main winding as an induction motor.

Capacitor Start Capacitor Run

In the capacitor start capacitor run motor a run capacitor is added to the running winding in order to obtain higher overload and lower starting current. However, the capacitor start capacitor run motor differs from the capacitor start induction run in that it starts on both windings and when the rotor reaches about 75 per cent of rated speed the centrifugal switch opens, disconnecting the starting capacitors but leaving the run winding in the circuit. The motor then runs on both windings.

Repulsion Start Induction Run

There are two basic designs of the repulsion start induction run motor, the most common being the type where the brushes ride the commutator during starting until switch speed (75 per cent full-load speed) when the flyweights on the centrifugal mechanism move outward and actuate rods, by which the brushes are lifted from the commutator. At the same time a short-circuiting ring connects the commutator bars and shorts all the rotor coils.

The second basic type of repulsion-start induction run is similar to the one above except that the brushes ride the commutator during starting and running. In this design the centrifugal mechanism merely short circuits the commutator and does not lift the brushes. The actual performance characteristics are essentially the same for both of these types of motors.

Advantages and Disadvantages

Now that we have discussed the basic operation of each type of single-phase motor we should discuss the advantages and limitations of each. Since the capacitor motors have been gradually superseding the repulsion types, we find that today the repulsion motor has practically disappeared from the fractional ratings of less than one horsepower. So we will consider only the integral horsepower-size motor of one horsepower and larger. In the photographs of the two types of motors on pages 52 and 53 we can see that the capacitor motor, by virtue of its simple squirrel-cage rotor and the minimum number of parts, is simpler and sturdier in construction. Simplicity means less maintenance and greater reliability. For example, the capacitor motor has no brushes, while the repulsion induction motor uses brushes. The brushes wear and may fail to operate because of dirt. The capacitor motor has no commutator; the repulsion induction motor has one.

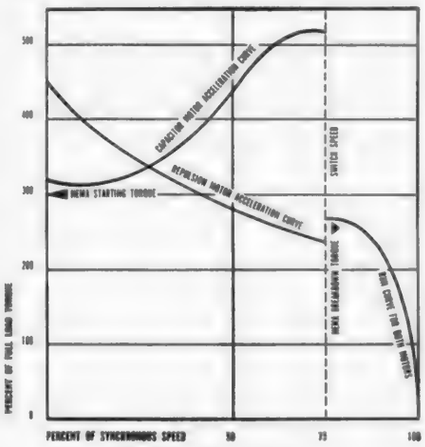
Also, because of cast rotor construction, the electrical characteristics of the capacitor motor are permanent, whereas the electrical characteristics of the repulsion induction motor can change due to brush wear, pitted commutators, improper operation of shorting device or when brush rigging is out of adjustment.

Capacitor motors can cause radio and TV interference at the instant the switch opens. Repulsion motors will give radio and TV interference during the entire starting period.

Performance Comparison of Basic Types

The comparison of electrical performance characteristics of the capacitor motor and the repulsion induction motor are important to the farm user. Here's how they stack up at various points in the performance cycle. In the chart on the next page are typical torque versus speed curves for

both types during the starting and running conditions. You will note that the repulsion induction motor has considerably higher starting torque than the capacitor motor; therefore, it has greater ability to start heavy loads. Since the repulsion induction motor has considerably lower starting current and very low-power factor in comparison to the high-starting current and high-power factor of capacitor motors, the net result on line-voltage drop is about the same. The starting torque is only developed at zero speed, but as the motor accelerates and approaches switch speed (the point where the transfer device takes the motor from starting winding to run winding), the torque of a repulsion motor is considerably less than the capacitor motor.



TYPICAL SPEED TORQUE CURVES

This torque, which is commonly known as the "pull-up" torque, refers to the motor's ability to accelerate the load from the starting winding to the run winding. Pull-up torque is very important because if it isn't great enough it may cause the motor to cycle on the starting winding which may develop overheating and motor burnout early in its service life.

Since both motors operate on the same principle—induction run—on the running winding at full speed they will have about the same efficiency, power-factor, and full-load current.

A major limitation in using capacitor-type motors is the effect of temperature on the capacitor and the resultant effect on starting ability of the motor. Capacitor motors are normally limited to surrounding temperature from -40 degree Fahrenheit to about +122 degrees Fahrenheit. A typical capacitor motor when operated in a -40-degrees temperature and at rated voltage will require approximately 20 seconds to develop full-starting torque. This is due to the freezing of the electrolyte in the capacitor. However, since this is not detrimental to the life of the capacitor or the life of the motor, the delay in developing starting torque is normally not a problem. For those applications where the temperature is consistently below -40 degrees Fahrenheit, a special capacitor must be used. At temperatures higher than +122 degrees F. and with rated motor temperature rise, the standard capacitor life would be shortened, and once again a special capacitor must be used.

Motor Housings

Up to this point we have discussed only the selection of the farm motor with regard to basic type. Once a motor has been selected, based on its operating characteristics, a choice must also be made between an open, dripproof, splash-proof, totally enclosed and explosion-proof motor. And all of these qualities come from the housing design of the motor.

Open motors and dripproof motors are designed for indoors and some outdoor uses provided the motor is kept dry and the atmosphere is normally clean. Openings for ventilation are designed to prevent objects or liquids from falling into the vital parts of the motor.

Splash-proof motors may be used indoors or sometimes outdoors in mild climates. This construction is so designed that it will protect the vital parts of the motor even where it is necessary to wash down equipment with a hose, such as in a milking parlor. However, as the new NEMA (National Electrical Manufacturers Association) designed dripproof motors are practically splash-proof in construction, this type of motor is seldom used for motors of one horsepower and larger. Most fractional motor makers provide enclosed motors for this type of duty.

Totally enclosed motors can be of two basic designs: one a totally enclosed non-ventilated and the other totally enclosed fan-cooled. Since practically all general-purpose single-phase motors are only offered totally enclosed fan-cooled, we should comment only on its construction. It is designed to protect the motor from dirt, grit, and water in the atmosphere as well as from falling particles and liquids. This type of motor is designed for exterior cooling by means of a fan or fans, integral with the motor but external to the enclosing parts. The fan carries the heat from the surface of the frame, plus scrubbing the frame of foreign material. Too often this motor is overlooked in farm applications because of its initial higher cost. However, over a period of time, this motor will more than make up the difference in initial cost in trouble-free, continuous service.

Another construction available, but not commonly used on the farm, is the explosion-proof motor. An explosion-proof motor is a totally enclosed machine. It is designed for use in hazardous locations and constructed to withstand an explosion which may occur in the motor and prevent the ignition of the hazardous atmosphere surrounding the motor. Each motor carries the Underwriters' Laboratories label and the particular hazardous condition for which it was designed is designated on the nameplate. The most common explosive atmospheric conditions encountered on the farm are those atmospheres containing gasoline, petroleum, naptha-alcohol, and grain dust. These dangerous conditions can be found around such areas as gasoline pumps, storage areas of vehicles, workshops, grain elevators, feed mills.

For long, trouble-free service, a farmer should consider the type of bearings used in the motor he is going to buy. In some sizes, such as fractional horsepower motors and motors of one horsepower or more, there may be a choice between sleeve bearings or ball bearings.

For most general-purpose jobs using ¾ and larger horsepower motors, the common type is the ball bearing motor. This type of motor may be operated in any mounting position. Some ball bearing motors are designed for relubrication at infrequent intervals where service or atmospheric conditions are severe. Many ball bearing motors are equipped with prelubricated sealed bearings which require no lubrication. Some fractional horsepower motor manufacturers, who use open or single shield or single sealed bearings do not provide methods of relubrication without the disassembly of the motor. Lubrication of these motors is normally recommended on an average of every 5 to 10 years. If the atmospheric conditions are very wet or dusty, then it is best to follow the specific recommendations of the motor manufacturer.

Sleeve bearings are most common in fractional horsepower motors. Sleeve bearings are usually oil lubricated and are normally designed for operation in a horizontal position. Most manufacturers are now offering "all angle" sleeve bearing motors, but this construction is available in fractional horsepower sizes only. Sleeve bearings are most commonly used where extremely quiet operation is desired. The cost of sleeve bearing motors in fractional horsepower sizes is usually less than the equivalent ball bearing motors, whereas in motors of one horsepower or larger, the sleeve bearing price is generally the same.

General-purpose motors are normally furnished with either a rigid type base, which may or may not be an integral part of the motor frame casting, or with a resilient (cushion) base. The rigid base is most common and is the least expensive, and will fulfill almost all the requirements for farm jobs. The rigid base can be used with sliding rails or a slotted base attachment to adjust belt tension and alignment of motors. The resilient base is the choice when the motor is to be mounted on a material which may transmit vibrations and amplify the vibrations to an objectionable noise level. Sometimes the rigid mount type can be steadied by placing rubber between motor base and mounting bed and around the mounting bolt, but quite often, due to the nature of operation of the equipment, this will not help to reduce vibrations. In these instances a

(*Continued on page* 123)

NUTRIA
poor man's mink

The fur industry is buzzing about mutant Nutria, which comes in pastel colors. Four cents a day will feed an animal

FUR FARMING has its ups and downs—so many ups and downs that it has become a symbol for the rural long shot. Success has been governed by the fickle tastes of women and the dictates of fashion. Add to feminine whim the hot air which promoters pump into the industry, and you have all the ingredients of a gamble which makes the weather and the grain market look puny.

First came the rabbits—white, black, chinchilla, Angora; then the foxes—white, black, silver; then mink, with many exotic variations of color; then Persian lamb; and for several years now it has been the ultra-ultra of all furs, the chinchilla. Today it is the nutria, a South American rodent, which is receiving the attention of fur farmers.

In addition to these leaders in domestic fur production, there have been lesser ventures into beaver, skunk, otter, opossum, raccoon, marten, fisher, and muskrat. One of the most fantastic ventures was a cat and rat closed circle production line which claimed the attention of the balmy fringe at one time. You caught yourself a pregnant rat and a pregnant black alley cat; you fed the rats to the cats and fed the rats the carcasses of the cats after you had taken the pelt. The big job was to keep everything in balance. There was one catch: no one wanted black cat fur coats.

The lone prosperous survivor is mink. Partly through intelligent and intensive promotion, and partly because fashion has so dictated, the American woman has become mink-minded and the rich, heavy fur has become the symbol of the carriage trade. Mink farming is a stabilized and profitable business that has enjoyed a long-time prosperity and seems to be as permanent as an industry can be that is based on fickle fashion. Chinchilla, which is even more a luxury fur, has not, to this time, established a firm and stable market, chiefly because too few pelts are available, and there is only a limited clientele for $10,000 coats. The chinchillas for some time were unable to surmount the first stage of fur promotion, the sale of breeding stock. Breeders sold breeding stock to others for breeding stock who expected to sell breeding stock to new adventurers. Occasionally an animal died, or was off-quality as a breeder; these pelts were practically all that reached the trade until about two years ago. Just now the nutria business is in that stage.

The promotion of nutria as a fur farm specialty is not new. Nutria fur from Europe, Louisiana and Texas has been a sluggish item among furriers for years. Back in 1899 the first animals were imported from South America. In 1938 there were other importations to the west coast and Louisiana. The importers began to ballyhoo breeding stock, promising quick and easy fortunes. However, the animals were of an inferior grade, and Mrs. America wasn't attracted to the reddish-brown fur, processed to look like beaver. Most of the breeders folded, and their animals either escaped or were turned loose. In Louisiana, the nutria found the bayou country to its liking, and began to multiply at a great rate. In 1943-44, there were 436 pelts taken; in 1955-56 there were 374,199. Wild nutria pelts bring 50 cents to $1.50 in a desultory market. They are difficult to skin, scrape and stretch, and trappers are unenthusiastic about taking them.

The wild nutria pelts that are coming out of Louisiana scarcely make a dent in the immense population in the bayous and ponds of that state. People down there wish the fur would become more popular, for nutria threaten to eat the farmers out of house and home. It all started back in 1938 when E. A. McIlhenny, of the Tobasco sauce family, imported a few pairs to his Avery Island estate. He built escape-proof fences around a stretch of swamp and turned the nutria loose. The big hurricane of 1940 damaged the fences and the nutria lit out for neighboring bayous and marshes. They spread out in all directions, cleaning up everything as they went. When the bull-rushes, cat-tails and other aquatic vegetation gave out, they invaded the neighboring corn and cane fields.

Across the line in Texas nutria have been equally ungrateful. The Eagle Lake Rod and Gun Club in 1950 released four females and a male in Eagle Lake to clean up the weeds. The nutria obliged, leaving the lake as clean as a whistle, but they went right on and cleaned out the Club's precious duck cover and when that gave out, they staked out eating areas in the neighbors' crops.

People down there are looking for relief before the nutria become an acute menace to crops and the valued duck cover of the two states. Since trapping for fur seems unable to control the prolific nuisance, some have suggested that people turn the tables

on the nutria and start eating on them. Nutria meat is delicious, its devotees say, resembling suckling pig when roasted. It's good barbecued, and doesn't turn black as does muskrat flesh, but stays pink and looks fine on the table. Barbecued nutria, in one-pound cans, can be bought in some of the fancier delicatessens. It sells for around $3 a pound, not quite as high as rattlesnake meat or French fried bumble bees.

The nutria which is enjoying the present boom is not the wild nutria of South America or Louisiana, but a mutant which has been selectively bred and developed in Germany. These first animals were imported into Germany for food, but later breeders used mutants to produce a better quality, and, the ranchers believe, a more acceptble and fashionable fur. The new nutria come in white, a light tan or beige, silver, and brunett.

It is doubtful if one could buy a white, beige or silver pelt from a furrier today. All the animals imported from Germany are being used exclusively as breeding stock. The price of a pair of pastel nutria ranges from $250 to a greatly inflated $2,000.

The Nutria Is A Rat

The nutria is a native of Southern Argentina, where it is now practically extinct. Scientists call the animal Myocastor coypus; you'll find him described briefly in the encyclopedia as a coypu; the everyday name is nutria, which, if you want to split hairs, is rightfully the name of coypu fur. He belongs to the rodent family, and is a cousin of the common rat, the beaver, the mouse, and the squirrel.

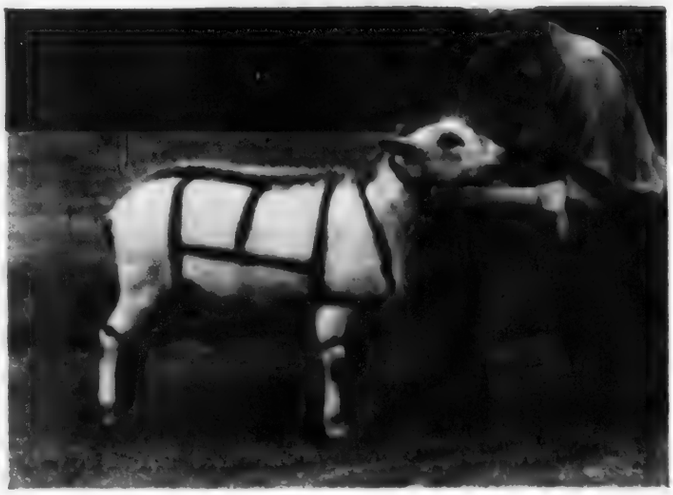
Nutria are vegetarians and will thrive on anything in that line—grass, legumes, vegetables, fruit, and grains. A man with a patch of clover and grass just about has his feed problem solved. Most growers feed a little grain, barley or corn. The animals need a little salt. They love watermelon and carrots.

He is an aquatic rodent, spending much time in the water. His hind feet are webbed the better to swim, but his front feet are similar to the feet of the raccoon or monkey. He uses them to sort out his feed and to hold it while eating. He is about three feet long when full grown, tail included. Males will weigh up to 35 pounds. His tail is rounded and practically bare. The fur is dense and soft, with long, bristly guard hairs which are clipped off in processing and used in making felt hats. His head is much like a beaver's and he has four big, orange-colored gnawing teeth which he uses freely. The female nutria has one of the handiest arrangements in the animal kingdom. Her ten teats are arranged in two rows near the spine on top of her back. This, apparently, is to enable her to suckle her young while in the water. The kits ride piggy-back for a swim, lunching as they go. The belly fur is the most desirable in contrast to the back fur of other animals.

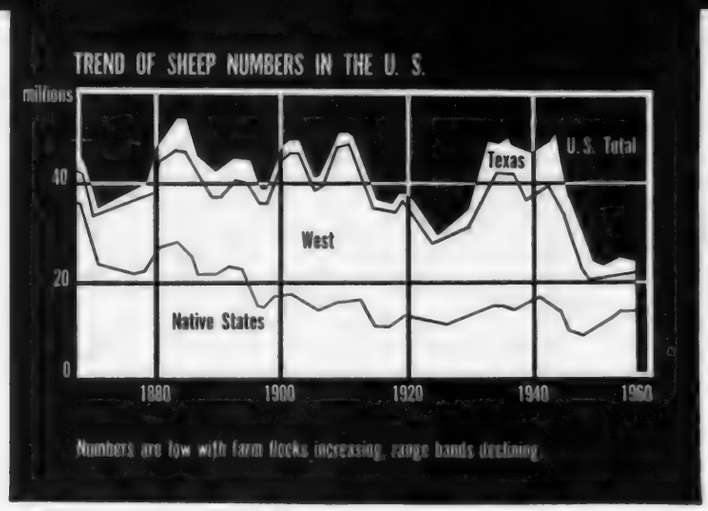
Nutria will have two litters a year, or five

(*Continued on page* 70)

Gordie Voight (above) holds two half-grown nutria, a brunett and a white. The tail is a handy handle for handling. Note the webbed hind feet and the monkey-like fore feet. At right is a Voight pen with pool. Fresh water runs in at one end of a series of pens and out the other end. A grill prevents escape into adjoining pens. This is a month-old litter.



A little grain goes a long way with ewes. The wether (right) has been given a one-sided shearing and marked to show why it takes a good hind end to make a choice lamb. The hind leg down to the hock, and the loin, just in front of this cut, make up 50 per cent of the carcass, 65.6 per cent of its value.



By Charles R. Koch

Don't Sell Sheep Short

With Western bands shrinking and lamb and wool prices riding high, the future looks good for farm flocks

"WITH THIS PRODUCT I don't have to apologize to anybody for adding to the surplus; with good management there's a chance to make a nice profit; and the way things look right now, this is going to continue for some time in the future. I'm staying with sheep." This is Glenn Robinson talking. Robinson, an ex-Air Force gunner, is co-owner of a flock of 700 ewes which he and his brother-in-law, Earl Engelson, run on their adjoining farms in Hardin County, Iowa. His opinion jibes with the general sentiment one encounters among sheepmen all over the Hawkeye state; and measured against the prediction of an expert like Rath Packing Company's L. M. "Doc" Kyner that "the future of the sheep business is east of the Missouri River," it gives a fellow something to think about, particularly in sections where the feeling has been that sheep are a declining enterprise on the farm.

After reaching a high point of more than 56 million head in 1942, United States sheep and lamb numbers declined steadily to a low of 29.8 million in 1950 and have leveled off during the past six or seven years on a plateau hovering around the 31 million mark. The big decline has been in the western range flocks. Last year, for example, flocks in the Mountain and Pacific Coast States declined 2 per cent; Texas flocks dropped 14 per cent and as of the first of the year were 35 per cent below 1951. But in North and South Dakota, Nebraska, Kansas, Iowa, and Missouri, numbers increased 5 per cent and every state east of the Mississippi River, with the exception of Virginia and West Virginia, either maintained or increased the numbers of their sheep and lambs.

There are some very basic factors behind this trend, factors which, it seems safe to say, are not going to reverse themselves in the near future. Briefly, they stack up like this:

(1) Labor. The herder is the backbone of the western sheep industry. But herders are hard to come by these days and those who can be trusted with a band command salaries in the neighborhood of $200 per month and keep. A thousand ewes and lambs are about the most one man can handle, so this assesses a charge of about $3 per head against each ewe in the band, just for herding. That is a high base upon which to start piling other costs of the enterprise.

(2) Drouth. While sheep are generally considered better able to withstand drouth conditions than cattle, the extremely dry weather of the past few years in the Mountain States, and particularly in Texas, has forced liquidation of flocks.

(3) Competition for land between sheep and tourists. Much of the government-owned western land once available for grazing flocks has been labeled out-of-bounds for sheep and reserved for vacationers. Ernie Beilfus, head of the sheep department of the Chicago Producers' Commission Association, tells how they used to get as many as 200 double-deck carloads of sheep out of the Mt. Rainier National Forest area every year. "Now we get no more than two loads a year," he says.

(4) The fact that during the late '40's and early '50's the profit prospects were so much better in cattle than in sheep. "Cattle made dollars while sheep made dimes," Doc Kyner says. "And besides that, the government had gotten into the wool business and pushed prices way up there, then pulled out and let them drop. That was mighty hard on a lot of sheepmen and they switched to cattle."

(5) High weights on range lambs. To recoup a greater percentage of the total value of the finished lamb, ranchers have been breeding larger animals which finish at excessive weights unacceptable to eastern buyers.

(6) The substitution of synthetics for wool. Nylon, dacron, and a variety of kindred synthetics burst into the textile picture a few years back and at least temporarily darkened the future of the wool market.

Wool is Here to Stay

But experience has proven that wool is a unique fiber for which it is hard to produce a real substitute. A cigarette burn cannot be rewoven in the synthetics like it can in wool; a woolen garment on a hard-working Arctic trooper may become soaked with sweat, but it won't freeze to his body when he cools off. Wool is still a strategic material. The governments of the world are well aware of this and it is one of the reasons Congress passed the National Wool Act of 1954, recognizing wool as "an essential and strategic commodity not produced in quantities and grades in the United States to meet domestic needs." We produce only about one-third of the wool we consume annually. The Act authorizes the payment of direct subsidies up to 110 per cent of parity to producers of wool and lambs until an annual production of 300,000,000 pounds is reached. American production was around 279,000,000 pounds at the time of the passage of the Act and is still

Birdsfoot trefoil pastures play a big role in helping produce the hundreds of premium lambs Glenn Robinson (above) sends to market every year. Vo-Ag teacher Marshall Grosscup and student Donie Roberts (left) mouth a ewe as Grosscup advises the purchase of 5-year-olds. "They are cheaper and they lamb easier than yearlings," Grosscup explains.

holding around that mark. After it reaches 300,000,000 pounds the support price will range between 60 and 90 per cent of parity to encourage an annual production of 360,000,000 pounds.

Farmers who exercise careful management practices find that the wool subsidy is at least sufficient to cover the depreciation on their ewes, a good clip of wool goes a long way toward paying the ewe's keep for the year, and the lamb income is distributed between labor and profits, both of which go to the farmer himself. At the Spooner Branch Experiment Station of the University of Wisconsin, for example, detailed cost records kept for the years 1946 through 1954 showed labor returns per ewe ranging from $16.54 to as high as $33.51, an average of $21.93; or a return of $153.51 per animal unit using a comparison of 7 ewes equal 1 cow or animal unit.

So while the sheep industry has been having its troubles in the range country, prospects look good throughout the rest of the nation, good enough to look appealing even on some of that expensive Iowa corn-hog land. Still, it takes good management to consistently show a profit with sheep. For some specific examples of good management, let's drop in on a few sheepmen in the vicinity of Waterloo, Iowa.

The Rath Packing Plant could well be considered the heart of the sheep business out there. This huge slaughter house processes 2000 to 2500 head of lambs a day, 5 days a week, every week of the year. They always have several thousand lambs on feed at their adjacent Hilltop feedlot in what they call a reservoir operation to insure their having sufficient numbers on hand at all times. But the bulk of their kill comes from outside sources, and under the direction of a red-topped dynamo, who goes by the name of Bernard Ebbing, and his partner, Lou Thompson, they have promoted sheep clinics and have worked closely with the College Extension Service and with 4-H and FFA groups to build up a healthy sheep industry in the surrounding countryside.

Every fall they offer these up-coming young farmers the opportunity to get into the business with the purchase of bred western ewes, offered in lots of 5 or more, or of western feeder lambs in 16-lamb units. The produce of the bred ewes are eligible for entry the following June in a Quality Lamb Show the company sponsors. It is an educational program which is paying off in more and better flocks. And, incidentally, one of the points of the program from which any sheepman, and particularly the newcomer, could profit is their insistence that the youngsters start out with good quality 5-year-old ewes. These ewes will have several years of productive life ahead of them and they have a much easier time at lambing than do yearling ewes. Ebbing feels that a 70-per-cent lamb crop is almost the best that can be expected with yearling ewes, but that a 110- to 130-per-cent crop is well within reach with the older ones. Two-, three-, and four-year-olds are usually as good as the five-year-olds in this respect, but are too high priced.

Over at Jesup, a few miles east of Waterloo, Marshall Grosscup teaches vo-ag classes and has done an outstanding job of turning out enthusiastic young sheepmen. This past year 19 of his 49 students went into sheep projects, starting with bred ewes. The majority of them came through with highly successful records. Ivan Collins, for example, who was the President of the FFA Chapter and earned the coveted State Farmer Degree, was one of them. Ivan was not exactly new at the game. This was his fourth year and during those four years he picked up $2000 in labor income from his small flock. He started with a half-dozen bred ewes when he was a high-school freshman, eventually worked up to a 70-ewe band.

Management Does It

The secret of success with young Collins and his colleagues, according to Grosscup, is that they follow a management program which keeps them from getting careless with details. They feed carefully, shear early, get their lambs to market early, and keep after the internal parasites continually. Since we are going to look at the feeding practices of a couple of experts a little farther on, we will skip that point here. The early shearing insures freedom from maggots and insures against loss of wool as the season progresses.

The chart on Page 61 shows at a glance why it pays to finish lambs and get them on the market before the 15th of July. Last year was typical for price movements. The market for choice and prime lambs hit a peak of $28.70 the week ending June 9. A week later it had dropped $2.05. It slid below $23 by the end of the month, recovered again early in July, dropped back to $23.40 on July 14 and receded from this point for the rest of the year. On such a market, which is typical year after year, an 85-pound lamb would be worth $24.40 the middle of June. By the first of August, a 100-pound lamb would bring only $23.12; and that August lamb would have to fight heat and midsummer worms.

The boys were recently treated to a dramatic picture of the damage stomach worms can inflict on their flocks when Professor A. L. Pope, of the Animal Husbandry Department, University of Wisconsin, spoke at one of their field days and told of the experiment he had run to determine how much blood worms can re-

move from a lamb. Working on the assumption that the hemoglobin (the red pigment) is a good indicator of the degree of parasitism he gave a lamb 40,000 larvae, then, as its hemoglobin declined, he reduced the hemoglobin of a check lamb by daily bleeding. During an eight-week mid-summer period, from July 6 to August 29, he removed 7,150 cc. of blood, approximately 8 quarts, from the uninfected lamb to maintain its hemoglobin count at approximately the same level as the infected lamb. This amount of blood, he estimated, was four times the total blood volume of the lamb. In other words, these lambs, which were three months old and weighed 50 pounds at the start of the experiment, had to produce four times their total blood supply during the eight-week period just to feed the worms.

Then Pope went on to show how it takes a constant battle to whip the worms. "If a drench is administered to a sheep which carried 8000 worms," he said, "and is 90 per cent effective—and incidentally, that is very good—7200 worms are removed and 800 are left unharmed. Half of these will be females and a female worm lays 5000 eggs a day. That means that the 400 female worms in the sheep would produce 2,000,000 eggs per day, or 80,000,000 eggs would be scattered about the pasture by a flock of 40 sheep, the day after they were drenched. There is no such thing as a one-shot cure."

For a really effective job of worm control, Pope recommends good pasture, a trace mineralized salt, dicalcium phosphate, phenothiazine mixtures and drenching according to the calendar, not just when the flock looks wormy. Here is his worming calendar:

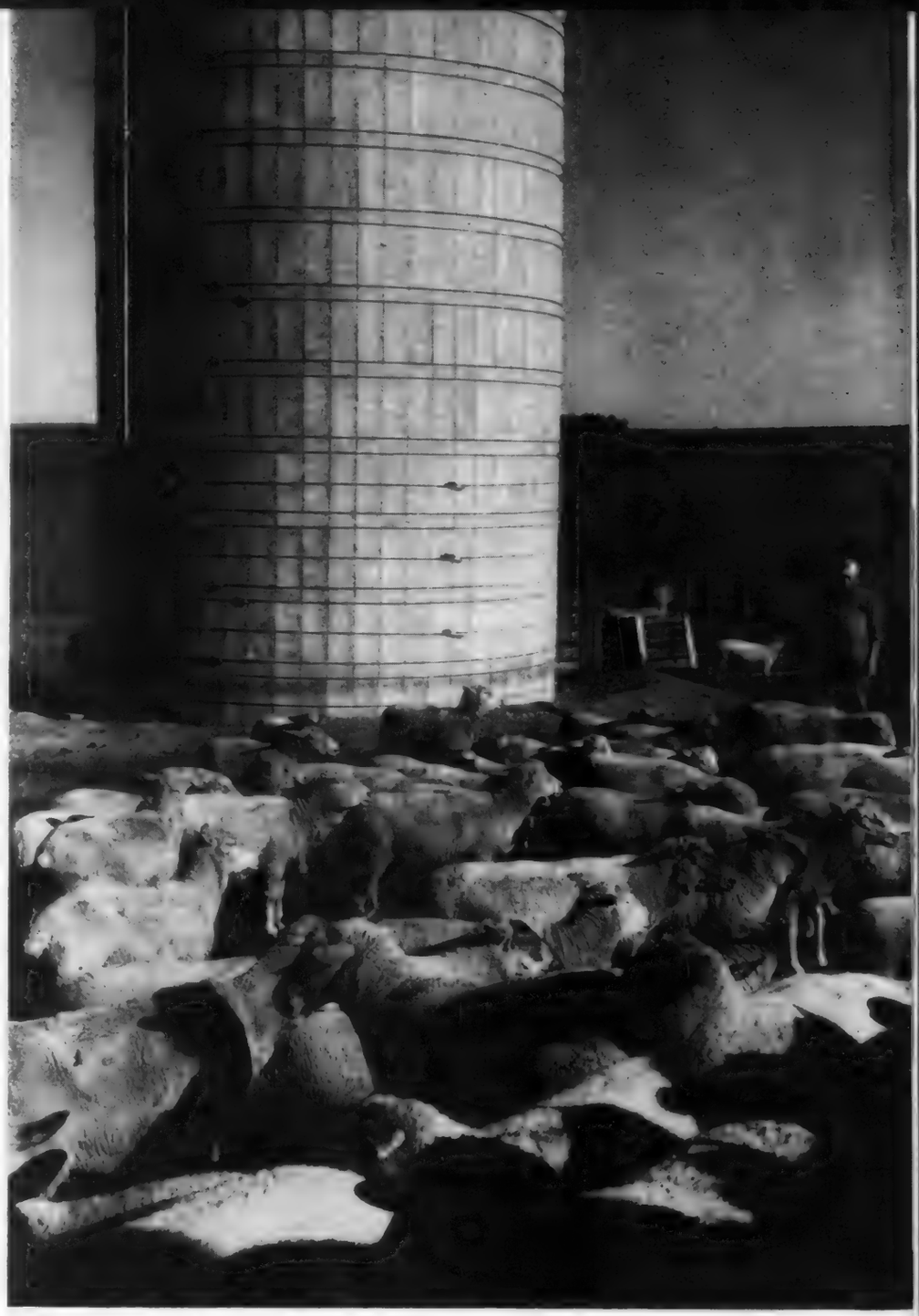
(1) Use liquid phenothiazine on the ewes within a week before turning on pasture in the spring. The lambs need not be drenched at this time.

(2) In mid-June drench all lambs and ewes with phenothiazine and lead arsenate to combat both stomach and tapeworms. Use one ounce of phenothiazine powder and one gram of lead arsenate for the ewes. For the lambs, ½ ounce of phenothiazine and one gram of lead arsenate if they weigh over 40 pounds and are over 3 months of age.

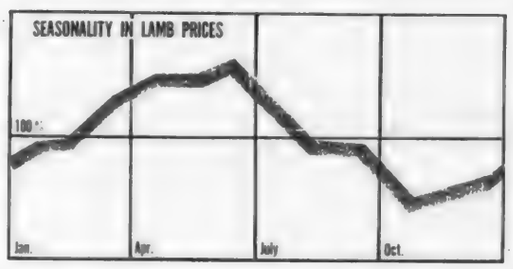
(3) In July, or at weaning time, lambs should be drenched with copper sulfate-nicotine sulfate (blue vitriol and Blackleaf 40) before turning on clean pasture. The ewes should also be drenched. This treatment is primarily for bankrupt worms, but it hits stomach and tapeworms, too. To make the drench dissolve 2 oz. copper sulfate (blue vitriol) in a gallon of water. Add 2 oz. Blackleaf 40. The dosage for an adult sheep is 3 oz.; for a yearling, 2 oz.; for a 6 month-old lamb, 1½ oz.

(4) Several weeks before breeding drench ewes and rams with liquid phenothiazine and turn on flushing pasture. The

(*Continued on page* 90)



Iowan Robert Stark brings his 300 ewe flock into the barnlot before dark as a precaution against marauding dogs. The chart shows why his plan of early summer lamb marketing pays off. Prices reach a peak in mid-June then decline until late October when they start to work their way upward again.



WAR ON WEEVILS

We can stop the grain bin robbers cold with modern chemical warfare—but let's do it without gassing ourselves

Probing for weevils is done with a steel rod tipped with a case for a sampler and thermometer. Hot spots indicate weevil activity.

SINCE FARMING FIRST BEGAN, the farmer has been locked in battle with the insects. The meanest of these pests are those that wait until all of the work of planting, growing, harvesting, and storing has been done and then eat the grain in the bin. Among the many weapons man has used in his fight, the poisons have often proved too dangerous for man, himself. Today, we have good chemical weapons and we know the care that we must take to keep from being injured by them.

So certain is it that these pests will infest stored grain that as late as the middle of the last century scientists were using them as an example of spontaneous generation. "Place damp grain in a clean vessel," they said, "and store the vessel in a warm, protected place. In two weeks, weevil will be generated." And they were believed—for it always happened. And it is still happening.

It is little wonder that men believed the insects were generated by the grain for they were everywhere and unavoidable. In a way the grain *did* generate the insects, for often the eggs were already in the grain when it was stored. And even the cleanest of the wooden granaries, bins that had been swept and scrubbed, might contain thousands of cadelle larvae which had tunneled deep into the wood of the structure.

Long before the plagues which Moses and Aaron saw visited upon the Egyptians, the subjects of the Pharaohs knew the insect pests which still plague us today—the weevils and the beetles and moths that eat our stored grain. We know that they were there, robbing the Egyptians, for the mummified remains of many of the same species that are pests today have been found in the grain storage jars which were sealed and set in the tombs as food for the dead thousands of years ago.

This is all true today—for the insect has neither learned nor forgotten a thing in the last five thousand years. Fortunately, man has.

We have studied the life cycle of each of the insects that plague us to learn their habits and their weaknesses. We know when in their many stages of growth and reproduction the pests are most vulnerable and we know their likes and dislikes and the food that nourishes them and the poisons that will do them in.

We know that they like warm, moist, cozy, unventilated grain bins and that the ones that are strong enough to gnaw at the fresh grain have weaker cousins ready and anxious to scavenge the partly eaten and broken kernels. Weevils cannot breed at all in grain that has a moisture content below nine per cent and they reproduce in very limited numbers until the grain moisture gets to be over 11 per cent. The destructive saw-toothed grain beetle and some of the other beetles do not breed in clean seed unless the moisture content is 11 per cent or over *or* unless the temperature is 80 degrees Fahrenheit or above. This shows the close relationship between temperature and moisture. This temperature-moisture relationship explains why northern corn is rarely attacked by insects during the first winter even though it may have 20 to 25 per cent moisture when stored.

This does not mean, unfortunately, that all insect activity stops when cold weather sets in. The grain itself is a living thing and gives off some warmth all of the time. If chaff and dirt and broken kernels trap this warmth in pockets, the insects perk up, give up their cool, Platonic relationship, and start multiplying and eating and eating and eating. The broken kernels which they create and the floury dust

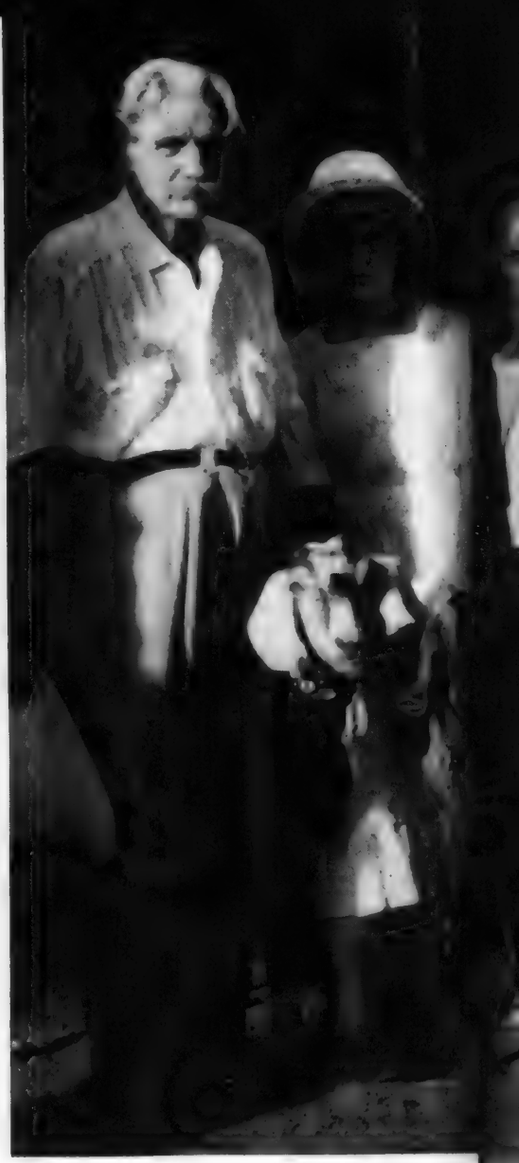
(*Continued on page* 114)

A gas mask (right) filters out the poison as the vapor goes through the canister and permits the pure air to continue through the tube to the mask. It's needed for this job. Adjusting the mask is as important as having the proper canister for the gas being used. Spraying (above) fills the bin with heavier-than-air vapor which flows out the door and over the canister. Safety experts recommend a back-pack arrangement to shield the canister.

Fumigant Dosage per 1,000 bushels for Various Grains

	Small grains except sorghum	Sorghum	Corn
Carbon tetrachloride	5	8	6
Carbon tetrachloride:			
4 parts — 1 part carbon disulfide	3	8	6
1 part — 3 parts ethylene dichloride	6	10	6
19 parts — 1 part ethylene dibromide	3	8	6

Fresh Milk for the Jungle



A herd of Nubian Dairy Goats make a 9,000-mile trip to Dr. Albert Schweitzer's Hospital at Lambarene

By Fred Knoop

AIR FRANCE'S PILOTS say the town of Lambaréné, in French Equatorial Africa, has the worst climate and is the most dangerous for tropical diseases of all the stops on their African flights. Here in 1913, just thirty miles from the equator in the steaming jungle, Dr. Albert Schweitzer established his missionary hospital.

My wife and I became interested in providing a source of fresh milk for Dr. Schweitzer's Hospital in 1955. With the help of many people and business firms all over the country, a herd of Nubian dairy goats reached Dr. Schweitzer in Lambaréné on May 3, 1957.

Why should a man, known all over Europe as a minister, a great musician, a philosopher and author of philosophical works read the world over, decide to bury himself in this most primitive country in Africa to help the natives, who probably would not appreciate what he would do for them?

To understand this one must go back to the little town of Gunsbach in Alsace, sometimes in Germany, sometimes in France. Here Albert Schweitzer had a

The young does are happy in their new home after a month at sea. Their resistance to insects and disease will enable them to provide the first fresh milk in this primitive country. At the left is Dr. Albert Schweitzer and next to him is Dutch nurse Ali Silver. In the center, between the two palm trees, is Maduma, the native herdsman. Dr. Byron Bernard and Miss Verena Schmidt are on the right. Below, the landing place for piroques in front of the Hospital.

happy childhood as the son of a village pastor. As a youth he became convinced that those who have good health, the strength for great physical work, and who have been spared pain and unhappiness in their own lives, must help in sharing and diminishing the misery of others. In short, his was the philosophy which flows from our Christian ideals and religion.

When he was twenty-one years old he resolved to devote his life to his chosen fields of art, science and religion, until he was thirty. If he had achieved fulfillment of his objectives in these fields, he would then decide to what profession he would turn to devote his life to humanity.

During the nine years that followed, he won his doctor's degrees in philosophy, in music, and theology, and became known in Europe as one of the great practitioners in each of these fields. And during these years he heard from missionaries of the great misery of the natives of French Equatorial Africa, in their struggle with the terrible tropical diseases of the jungle.

So in 1905, on his thirtieth birthday, Albert Schweitzer decided to study medicine to prepare himself for a new life of service in Africa as a physician and surgeon, "to bring the most needed of all needed things" to the natives. During his seven strenuous years of study of medicine, he continued to preach and give organ recitals in order to support himself. He wrote one of his major books, "The Quest of the Historical Jesus." He published the French edition of his biography of the composer, Bach, then rewrote it in German.

In 1913 when he was ready to go to Africa, he had only the money from royalties on his books, from his organ concerts, and from the gifts of friends, to finance his own and his wife's passage. With this money and without the help of any group or church, he was to finance the building and supplying of his hospital with medicine and equipment.

First, there were bamboo buildings to erect, and even before that, the great trees and vines of the jungles to clear. Much of this work was done by Dr. Schweitzer with his own hands. Natives helped, but they had to be supervised and prodded constantly. Termites destroy a building in six months so there had to be constant replacing of buildings.

Patients came by dugout canoes from miles around, literally thousands of them. In those early days, many were victims of sleeping sickness. And the bite of the housefly-size tse-tse fly, which deposited the small animal parasites known as trypanosomes in the bloodstream, causing sleeping sickness, was nearly always fatal. Today the dangers of this disease are still present, but the sufferers are isolated and treated at a French Colonial hospital. With modern drugs, the patient has a slight chance of recovery. Just about every disease that we know in America is present (except cancer), plus the strange and terrible diseases of the tropics: leprosy, amoebic dysentery, internal parasites, filaria, strangulated hernia, elephantiasis, ulcers, and the bites of venomous snakes.

Because Dr. Schweitzer and his wife were German citizens, they were interned by the French during World War I, but were later released to work in the hospital. It was during the war years that Dr. Schweitzer wrote of his philosophy of life

Dutch nurse Tony Van Leer stops to admire a new baby. Her smile and musical voice exemplify the spirit of the Schweitzer Hospital, bringing kindness and skilled medical care to people who have known little compassion from nature or man. Left, the hospital dock on the Ogowe River. The river is the artery on which all food, supplies and people travel. There are no roads.

and the phrase, "Reverence for Life," came to him in a mercy trip up the Ogowe River. On this phrase all Dr. Schweitzer's principles of life, morality, and philosophy are based. He says it this way: "Good consists of maintaining, assisting and enhancing life, and to destroy, harm, or to hinder life is evil."

Through the years the hospital has been enlarged, and was even moved four miles up the Ogowe River in 1925. Buildings now are made of corrugated iron and hardwoods to resist the termites and moisture of the tropics.

Albert Schweitzer is not forgotten in the outside world even though he lives and works deep in the jungle, where there is no transportation except by river and infrequent planes. In 1952 the world sought him out and he was awarded the Nobel Peace Prize for his work. With the $36,000 prize money he build a new village for his leper patients about a quarter mile from the main hospital settlement. Today, in his 83rd year, Dr. Schweitzer works from early morning until dinner time in the hospital and in supervising the planting of trees and maintenance of the hospital buildings. Then, until after midnight his kerosene lamp burns as he writes to his friends and finishes up the third volume of his "Philosophy of Civilization." Help and funds have come to him from Europe and America.

It was in an American campaign to send gifts and medicine to Dr. Schweitzer in 1955, for his 80th birthday, that my wife and I first became interested in the problem of developing a means of supplying milk to the hospital's patients. Neither farming nor dairying as we know them exist in French Equatorial Africa. It is estimated that 60 per cent of the children die of calcium shortage and associated diseases before they are sixteen. The original suggestion that a herd of especially selected dairy goats might be the answer came from Dr. Lent Johnson of the Armed Forces Institute of Pathology in Washington, D. C. Dr. Johnson pointed out that groups of organists were giving concerts to raise money for Dr. Schweitzer's Hospital and that people in many walks of life were giving of themselves and from their fields of special interests. He thought that breeders of dairy goats might want to assemble a herd to be sent to the hospital in Africa.

(*Continued on page* 79)

The Schweitzer Hospital is in the gorilla country. Penelope, a 3-year-old orphan, has been cared for just as a human child by one of the hospital employees. She has been given to the Cincinnati Zoo by Dr. Schweitzer and now lives in Ohio. Below, a native artist's impression of an antelope hunt.

Groceries & Notions

By James David Frye

JULIUS CAESAR TAYLOR'S general store in West Concord, Vermont, looked pretty much like any other of the '80's. The front of the white frame building with upstairs living quarters gave on an open porch and faced the packed dirt of Main Street. The back dropped down a banking above Higgins' sawmill.

Push into its warmth on a sub-zero morning and you breathed the fragrance of calicoes, ginghams, challies, flannel sheeting, denim, heavy silks (even velvets), along with stronger odors from leather boots, kerosene, coffee beans lately pulverized in the big red hand-grinder, rich country cheeses, pickles in an uncovered keg, and chunks of hardwood burning in a long iron stove.

These mingled aromas greeted me New Year's Day of 1888 as I began my service in the Taylor store, unaware of the course in public relations I was about to take. At nineteen I boasted no storekeeping experience. I measured only five feet four, but I was a cordy little fellow for all that.

Cordy, a fellow needed to be to work in a country store in an era when produce came mainly in barrels or hundred-pound bales. Clerks had to maneuver these without the sissy's aid of moving belts or rubber-tired trucks—muscle did it.

Barrels of flour, barrels of red Mackintoshes, barrels of "West Indy" molasses—or, on occasion, huge hogsheads of dark syrup. Barrels of potatoes from back-hill farms; of pickles, salt pork, sugar, and coarse salt. Barrels of flaky, round "St. Johnsbury" crackers baked in the next town, ready for chips of butter out of some farmwife's firkin. Bales and kegs of dried salt codfish to vary the West Concorder's diet of perch, pickerel, and horned pout taken from Hall's Pond.

All too often I found I must face up to a slippery green barrel of kerosene—a 300 pounder—which must be hoisted to a box top or rough horse, a kerosene can's height above the floor. Then I must pierce it for the flow which would fuel lamps to set Concord's hillsides asparkle at lighting-up time.

The uncounted hundreds of flour barrels I loaded into—then out of— J. C. Taylor's Dry Goods and Grocery Store! Almost every farmer's order began with, "I'll take a barrel of flour."

Mr. Taylor, father of six, had been previously served by my second cousin, Elmer Reed, and our business arrangement was much the same as that between him and Elmer. My pay would be in the form of room, board, laundry (with which went some mending) and a cash salary of $100 a year.

A hundred dollars a year meant a full year. Vacations, summer nor winter, were not in style and not even expected by a country-store clerk of the period. A year was a year was a year. But once, out of my fifteen months service, I did get off for a two-day fishing trip to Cow Pond, an unheard-of dispensation.

Puttering round the yard goods section my first week of employment, I overheard Mr. Taylor in converse with a farmer out front.

"I can say one thing for Elmer Reed," he said to John Pratt, "and I can't say it of any other clerk. At the end of the month he always had his full pay coming to him."

(*Continued on page* 83)

The items carried in a country store, and the smells that went with them, were astronomical. How to find them was a mystery, even to the storekeeper.

There was always the storekeeper who sat on the bench in front and waylaid customers for an argument. Here he is, bringing himself up to date on politics.

STORING CORN?

New LENNOX "600" Batch Bin Dryer will pay you 10-to-1!

That's right! The "600" Dryer shown above will more than pay for itself—it'll make you money! With LENNOX you can dry corn at a cost of about 1½¢ per bushel, then get an average of 20¢ per bushel MORE at selling time! If you're a feeder, your dry corn will keep better and have higher feeding value—there'll be no heating or insect damage, no spoilage.

The LENNOX Batch Bin lets you harvest at the right time and avoid field loss due to bugs and weather. Handles all crops—corn, beans, small grains, sorghum, rice. Two sizes—75 to 300 bushel, 75 to 600 bushel. Use with LP, oil, or natural gas heat source. Automatic controls for 100% safety.

The new "600" is heavy-duty throughout, built for long life and hard use. Bin is made of 16-gauge galvanized sheet steel, designed for complete recirculation without hand labor.

Oversize augers handle grain gently—they don't grind or chew it up—no dockage when you sell. Built-in air cleaner removes trash during recirculation. Powered by electric motor, gas engine or tractor PTO. Gas and PTO models completely portable. Nine-foot drag auger takes full width of truck body—saves grain waste and work unloading.

Find out more about how LENNOX can help you boost crop profits. Send for the Crop Drying Manual today.

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Town..... State.....

My favorite dealer is.....

.....

FROM THE FOLKS WHO KNOW CROP DRYING BEST

NUTRIA—POOR MAN'S MINK

(*Continued from page* 57)

in two years if pushed. The gestation period is 130 to 135 days and the litters range from four to eight. Breeding age is 8 to 10 months. A male can service seven to ten females and is housed with his harem until just before birth of the young. He is then taken away to prevent breeding too soon after the litter is born. The young are born with their eyes open and fully furred. They are weaned at six weeks. The animals are quite hardy and do well in both hot and cold areas. To this point, they are subject to no known disease. They have no parasites nor dietary ailments so common to mink. They are odorless, have an even disposition, and are easily handled, although they can inflict a nasty bite. Most growers use leather gloves to be on the safe side.

Pen requirements are flexible with the exception of water. They must have access to cool, fresh water. Growers have worked out a standard pen, usually built in series, of concrete or cinder blocks with a concrete floor scooped out at one end for a swimming pool. Closed nests are at the opposite end with a hinged roof for inspection. Each pen usually houses two females and their litters. Because of the gnawing habits of the animal, all raw edges of wood should be covered with metal.

One of the big producers of the new nutria at the present time is Merlin Voight, of Atlanta, Texas. Voight is an old-time mink farmer, and a successful operator. He started in mink 21 years ago in Wisconsin and several years ago bought 200 acres near Atlanta and opened a second operation there to have access to a cheaper feed source. A chunky, genial man with a whirlwind energy, he runs his two mink farms with the aid of his two sons. His older son, Cal, manages the Lomira, Wisconsin, operation, while Gordy, the younger, has charge of the Atlanta layout. Voight also grows Christmas trees on his 100 acres at Atlanta.

Mention nutria to Voight and you set off a chain reaction of enthusiasm and ideas for the future of the fur.

"I'll bank everything I have that nutria will be the rage in this country in a few years," he says. "Mink is here to stay for those who can afford it, but nutria will be the poor man's mink. Nutria will put a fine, rich coat on every stenographer in America. Look at the beautiful pelt—beige, it is, just the pastel color that American women like. You can't wear it out and it really looks richer than mink in a coat or a stole.

"I started with mink twenty years ago. I learned about genetics and I've bred some very fine types and I've been able to make money. But with five million mink pelts coming on the market every year, the big profits are gone. Feed is high and mink are very temperamental animals. I plan to keep on with them, but I'm pushing nutria as a supplement to mink. When I develop a big enough herd to take pelts I will feed nutria meat to my mink and cut out the biggest expense of mink farming. I plan, too, to start a cannery for nutria meat, which I believe will become just as popular as the fur. The pelt will be clear profit, for the meat will more than offset production costs."

Voight made his first importation of nutria a year ago and has imported about fifty each month since. He now has 200 breeding animals and says he cannot supply the demand for breeding stock. "I've sold mink all over the country," he says, "and I never saw the demand as hustling as it is for nutria. Why, just yesterday a man flew in here from Houston and took back twelve of my best animals.

"I don't do any horse-trading in my selling. My prices are the same for everybody and I guarantee every animal I sell."

Voight prices his animals according to color, quality of fur, and ability as breeders. The light shades bring the highest prices. Here is his price list of breeding age nutria for the 1957 season:

Brunett Female and Brunett Male	$200.00
Brunett Female and Myna Male	250.00
Brunett Female and White Male	300.00
Brunett Female and LaCosta Male	350.00
White Female and White Male	400.00
LaCosta Female and LaCosta Male	500.00

Brunett is a dark brown, much like the color of wild nutria,

New Holland's rugged 100-bushel spreader comes in either ground drive or P.T.O. models (Model 200 and 220)

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writes MR. C. E. CAMPBELL, Clay Hill Farms, Winchester, Virginia

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(signed) C. E. Campbell

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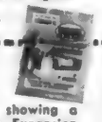

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but without the objectionable reddish cast. Myna is very dark, ranging from a black to blue-black. White is white, a pure white, and LaCosta is a light tan, or beige, almost identical in color to the fashionable buff-colored mink.

Voight recently made a tour of the country, visiting the prominent furriers. "Many of them had never seen a beige nutria pelt," he says. "They were enthusiastic and told me they wanted first chance to buy pelts as soon as we had enough to market. My guess would be that when there's enough of the new nutria on the market to establish standard prices, the average pelt price will allow a good margin of profit. I can produce such a pelt for $5, overhead and everything included. That is only a fraction of the cost of producing a mink pelt. A nutria pelt is three times as large as a mink pelt, and the feed costs only two cents a day.

"We've only scratched the surface in breeding out different color phases. I've learned genetics from my mink and I know I can keep attractive color variations coming up. That's a sure way to lick fashions—give them something new all the time. We found that out in mink. Why, there are seventeen color phases in mink, each with its own set price."

A crimson clover-vetch pasture near the feeding pens provides the bulk of the feed which Voight is giving his 200 nutria. He adds a little grain and throws them a few dead branches to chew on. "For a treat," he says, "I go to Atlanta and get a load of trimmings from a vegetable market. The trimmings from one vegetable market will feed enough nutria to bring a man a living wage."

His breeding animals are housed in three long series of pens, each with 25 individual pens each housing two and three females. The pens are 100 feet long, open to the air with the exception of the nesting section, and cost $1,500.

"It doesn't take much of a pen for nutria," he says. "That's why it's the perfect animal for the housewife, who can keep a few nutria in her backyard and feed them lawn cuttings and the

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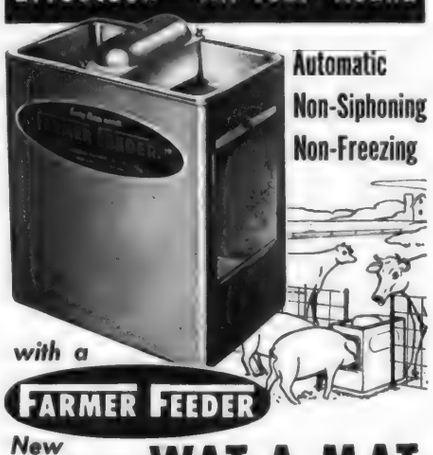

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TIPPING SCALES at 56 lbs. makes Larry Boysen, FFA president at Wapello, Iowa, mighty proud of this nine-week-old pig from his chapter litter. Vo-ag teacher Harold Hain (right) says low costs are what count. The chapter ran a four-feed test to see what feed gives both—low costs and fast gains.

What did they feed Lot 1?

Ever wonder if there's much difference in feeds today? If grinding and mixing really pays? Well, here's the test-proven story...

WHEN THE WAPELLO, IOWA, FFA chapter completed its feed comparison test last spring, some of the boys suspected they knew more about current hog feeding economics than their elders did. The youthful researchers were all badgered by grownups wanting to know what brand of feed was fed to which lot.

Until the four local feed dealers—competitors in business but co-operators in this FFA project—had been notified of the final results, brand names were a class secret. And then, as a matter of professional ethics, vo-ag instructor Harold Hain revealed only that the winning pen, Lot 1, had been fed on the Honegger free-choice program.

"We feel that this was a fair and accurate test and I can only let the figures speak for themselves," Mr. Hain states.

The four supplements tested were chosen by the class and fed according to local dealers' recommendations. In addition to satisfying their natural curiosity about brand differences, the class was interested in several other things. Is ground feed more economical than free choice of supplement and corn? Does it pay to feed oats to growing pigs?

Free Choice Beats Grinding

Grinding and mixing charges alone added 40 cents to the cost per cwt. of gain . . . without figuring the farmers' labor. Pigs on the two ground rations did make slightly better gains than their free choice counterparts. But the difference in gains is hardly significant when compared with the differences listed below:

	Free Choice	Ground Feed
Feed Efficiency	3.46 Lbs.	3.70 Lbs.
Cost of Gain	$9.33	$10.36

The Lot 4 ration featured, at different stages, both rolled oats and ground oats. Pigs on this treatment had the poorest feed efficiency and the highest costs.

COMPARATIVE RESULTS OF COMMERCIAL FEEDS
Wapello, Iowa, FFA Drylot Test — 1-1-57 to 4-8-57

	FREE CHOICE		GROUND FEED	
Lot Number	Lot 1	Lot 3	Lot 2	Lot 4
Av. Starting Weight	42.5	50.5	45.0	44.7
Av. Ending Weight	202.5	218.7	205.0	198.7
Av. Days on Feed	93	89	86.5	86.5
Gain per Hog	159 lbs.	168 lbs.	160 lbs.	154 lbs.
Supp. Cost per Hog	$3.85	$5.90	$4.69	$5.71
Supp. eaten per Hog	71.7 lbs.	112.5 lbs.	62.8 lbs.	77.5 lbs.*
Grain eaten per Hog	478 lbs.	471 lbs.	535 lbs.	486 lbs.¶
Feed per lb. gain	3.45 lbs.	3.47 lbs.	3.74 lbs.	3.66 lbs.
COST per Cwt. gain	$8.99	$9.67	$10.66	$11.27

* Included 50 lbs. concentrate, 2.5 lbs. sugar, 25 lbs. alfalfa meal and trace of Spergon.
¶ Included 411 lbs. ground corn, 50 lbs. ground oats and 25 lbs. rolled oats . . .

The fact that both free choice feeds outperformed the ground and mixed rations wasn't without some misgivings. Although the Lot 3 supplement is recommended for free choice feeding, Instructor Hain says hogs over-ate on it. They consumed three pounds of supplement for every two pounds eaten by the Honegger lot!

APPEARANCE and rate of gain aren't good enough guides to hog raising success, this test indicates. "There was no sickness evident in any other lots of pigs," Hain reports. Any feeder would have been contented with any of the lots, for Lot 1 certainly had no edge on appearance. But in terms of profits, they won the pencil-and-paper derby with plenty of margin.

Just luck, you say? Not likely; the differences are too substantial. Special treatment? Not a chance. Lot 2 pigs exercised in an East pen, Lot 3 and Lot 4 in South pens. Lot 1, the Honegger pen, was on the North side of the barn. They hardly saw sunlight during the whole test. They either exercised in two feet of snow or two feet of mud. Feed makes a difference, and these pigs got the best.

• • •

If you don't believe that Pig Popper and Hog Popper pellets are the finest hog feeds on the market, it must be because you've never tried them. These free-choice supplements, supercharged with H-58 wonder additive, will save you work, time and money. Farmers who keep feeding records, keep feeding Honeggers . . . year after year.

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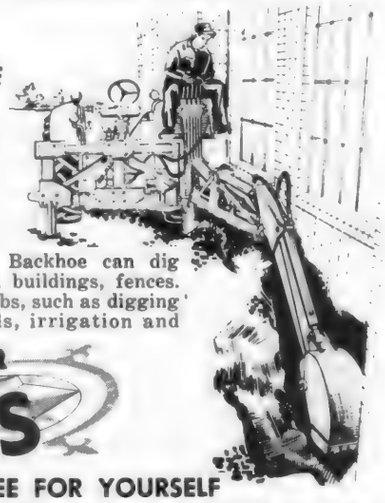

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trimmings from the vegetables. A man can raise nutria on a city lot as a hobby; they are no more trouble than rabbits.

"When I breed out a mutant with the proper color and have enough females, I plan to raise them on range—put all the females together with the proper number of males, let them select their own mates and their own nesting pens, and reduce feeding and care to a minimum. I plan a big concrete enclosure with a pool in the center and nesting boxes around the edge. Fresh water will be running through the pool and feed can be dumped at one end in a few minutes."

The nutria field, as with every new opportunity, has its share of promoters who are long on talk and short on facts. These individuals seek to make their profit selling breeding stock and talking a better game of "the market for nutria" than may actually exist. A booklet on this subject, "Raising Nutria in Captivity," is available from The National Better Business Bureau, Chrysler Building, New York City 17, N. Y. Send them a self-addressed, stamped envelope.

Most fine fur stores stock nutria fur coats ($700 to $1,200) and jackets ($300 to $500) but do not stock them in depth, that is more than 3 or 4 coats. But there are still parts of the country where nutria is hardly known as a fur. Between 800 and 1,000 furriers and department stores sell nutria coats and jackets. Their turnover is not known so the total number of pelts used a year is not available.

COTTON CHAMPS

(*Continued from page 37*)

liking for eating and as a home for raising big families.

After the thrips there will probably be a hatch of fleahoppers, and, of course, those old monsters of the cotton fields, the boll weevil and the boll worm. The weevil usually is the last to attack. There may be an early invasion, but whatever comes, the Pruetts waste no time in counter attacking. No bug eats long on the Pruett cotton, because of frequent inspections.

As soon as the cotton is well up, chopping and cultivation begin. The Pruetts give their cotton 3 to 7 cultivations, depending on the weeds, with standard tractor cultivators. The first chopping comes about June 1 and there may be as many as 5 if the grass is bad. The entire 600 acres are chopped by transient labor, 25 to 100 men, women, boys, and girls.

As soon as a few bolls appear on the bottom of the stalk, a second shot of 75 to 100 pounds of anhydrous is side-dressed.

The first irrigation usually comes about July 1 and there could be as many as 5, depending on the season. Three to four inches of water are put down at a time. Three to four weeks after the last irrigation, which comes no later than mid-September, the cotton is defoliated and two weeks later picking starts. The Pruetts have six pickers and these are busy from 45 to 60 days. The last of the crop is at the gin just before Christmas.

This brief detailing of how a cotton crop is raised makes it seem easy. Yet the farmer who raises better-than-average cotton goes considerably beyond anything that can be put down on paper. He uses his eye, as the husbandman does who fatteneth his ox. Jahue Pruett sums it up like this: "You've got to know the habits of the plant, how it looks when it needs something. For example, when the leaves begin to turn dark green, it needs water. You've got to know how to keep the fertilizer, moisture, and insect control in proper balance; you've got to take a look and know if it's time for a cultivation; you pick up a handful of dirt and squeeze it and you dig down and find how far the moisture comes, and you just stand off and look at the plant and know—if you're an old hand—whether or not it's in good health. A mother can take a look at her baby and tell you how it's doing. A good cotton farmer has to do the same."

The Pruetts have a conservative $100,000 in equipment and machinery. This includes 13 tractors, plus a crawler, which is used principally for fitting land for irrigation and subsoiling; 6 cotton pickers; surface and sprinkler irrigation equipment sufficient to irrigate 45 acres at a setting; 16 trailer wagons, 4 to 5

bales capacity, for taking cotton from the fields; cultivators, middle busters, subsoilers, harrows, plows, sprayers, and others too numerous to mention.

They have 12 full-time hands representing the heads of 12 families from which they can draw, as the need arises, about 30 workers. The 12 families live in tenant houses on the two plantations and are furnished with water, a kitchen garden, and a corn patch, which is planted for them.

The wage scale varies with the type of labor; the tops for a tractor driver is $7 a day; choppers get $3 a day, and full-time general laborers get paid $5 and $6 a day. There is no overtime and the hours are from sun to sun. Comes a wet spell and the weeds get ahead, competition sends up choppers' wages another dollar. Pipe laying for irrigation is all done by hand. Chopping is a backache job.

The labor situation in Coahoma County, and, in fact, throughout the south, say the Pruetts, is a pain in the neck. "A good tractor and machinery man is almost impossible to find," says Jahue. "They seem to have no idea at all what the connection is between the wheels and engine and steering wheel and the operation of the tractor. They never think of greasing a piece of machinery and they'll dump a tractor into a ditch time after time.

"But the worst thing about labor is the unreliability. I have a big turnover here. Maybe 7, maybe 8 of the 12 families we have, will pull up and leave just before the busy season starts—after we've kept them up all winter. They come up to the end of the work season just before Christmas and they haven't saved a cent. We loan them money for "Christmas fixins' " and then loan them money for groceries during January and February, and comes the first of March and we start breaking for cotton, they pull out and leave."

And he adds, wistfully, "I'd like to have just one good tractor driver."

(*Continued on page* 78)

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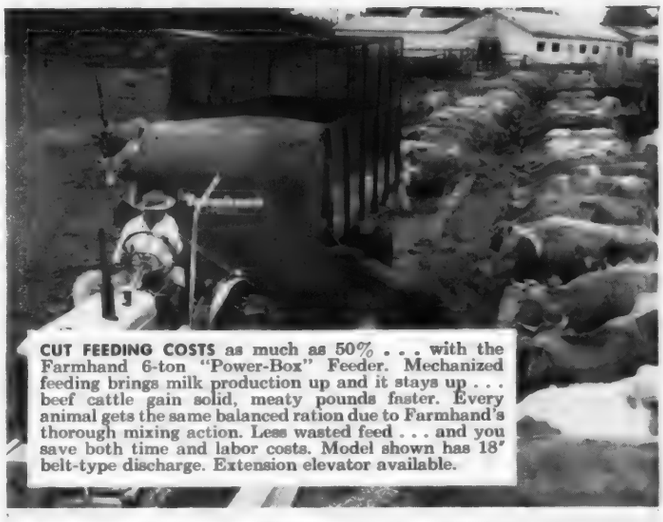

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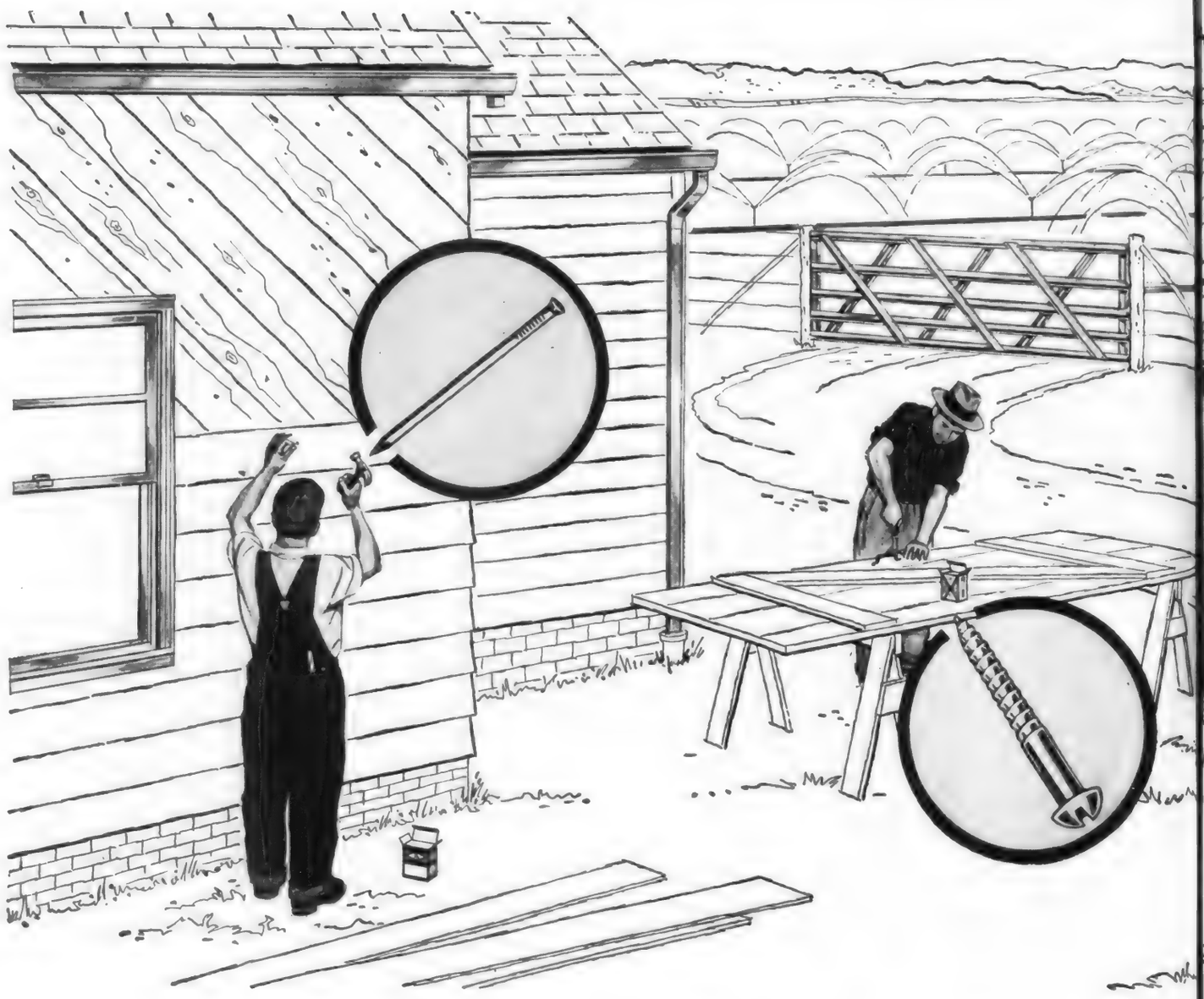

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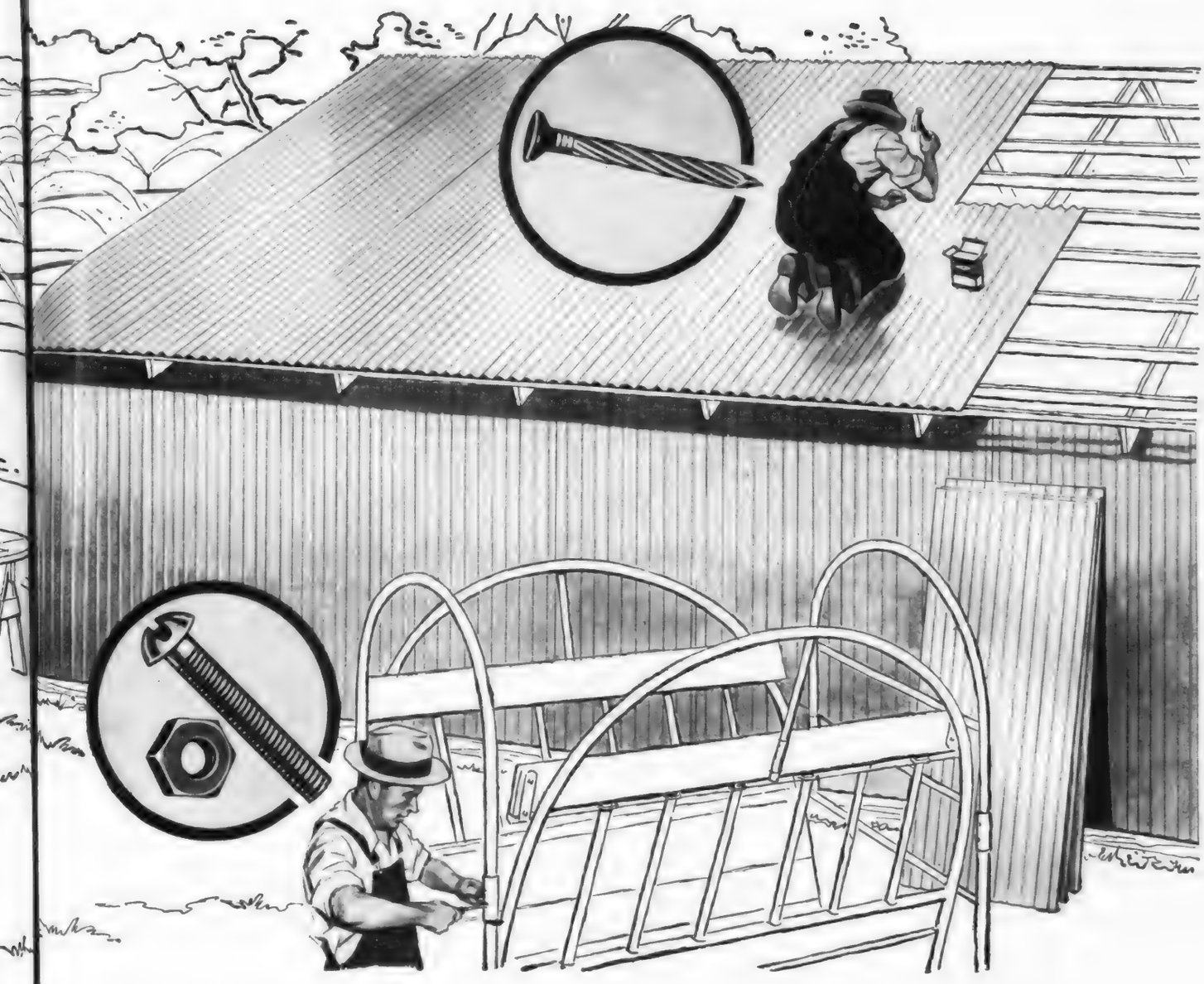

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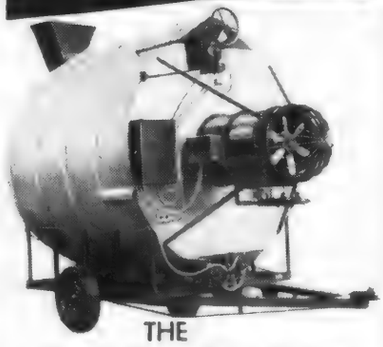

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(*Continued from page 75*)

Cotton is a high-labor crop and the inefficiency of labor adds to the cost of production. The number of laborers required for a given acreage are higher than on the average general farm in the midwest. There is a norm in the cost of production of Mississippi cotton, figured up and down from $100 per acre. The grower who tends to pinch pennies can cut down on chopping, cultivation and fertilizer and bring his cost down below that figure. Add irrigation, more fertilizer and cultivation and the cost may go as high as $140 which is about the estimate the Pruett brothers put on their costs. However, the grower who spends but $100 on an acre comes out with a bale or less.

In addition to 600 acres in cotton, the Pruetts have a sizeable acreage in soybeans. Last year 400 acres averaged 40 bushels to the acre and one field of 8 acres made 72 bushels per acre. About 275 acres are in pastures on which the Pruetts have 200 head of grade Herefords on a cow and calf program. They have good registered bulls and sell their beef, grass-fat, right off the pastures.

"Although we are supposed to have year-'round pasture here, we never get that much. Last year it was so wet we couldn't get the cattle out for three months. We haven't made any money on our cattle—prices too low. But we've used land that wouldn't be very profitable for cotton."

The Pruetts have only a very sketchy rotation. Mostly, cotton and beans go in the same fields year after year. However, they are convinced that rotation would benefit yields and plan to work into a cotton-bean-pasture (wheat, oats, vetch, fescue, lespedeza, ryegrass, Bermuda, Dallis), with some fallow.

"We have never used any other fertilizer than nitrogen," Jahue says. "Repeated tests have shown that our sandy loam Delta land needs no phosphorus or potash. We keep up the organic content of our fields by plowing down grasses and legumes and shredding the cotton residue on the field. We've tried extra doses of nitrogen

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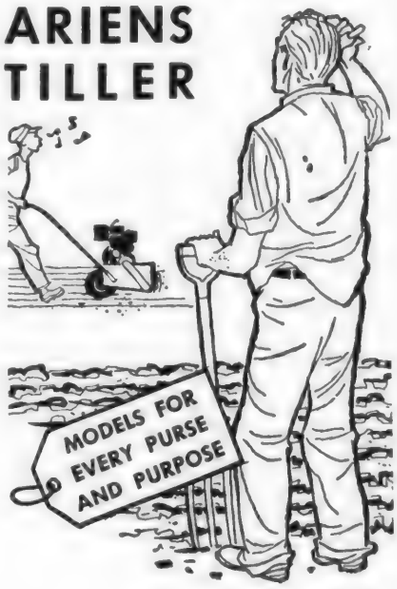

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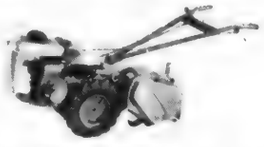

- **ARIENS MULTIMATIC**—the most versatile tiller ever made! Has 16" tillage width; provides 2-direction operation for front or rear-mounted, all year, Insta-Hitch attachments. Ball and cam differential for fingertip operation.
- **ARIENS ECONOMATIC**—a 16" tiller priced to meet all competition in the medium-duty class!

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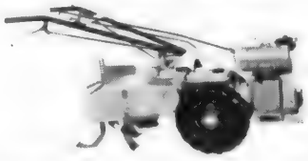

- **ARIENS TRANS-A-MATIC** tillers engineered for heavy duty jobs! Choice of two models: TA20A-8.1 h.p. Wisconsin engine; 20" tillage and TA28B-14.6 h.p. Wisconsin engine; 28" tillage. Exclusive ball and cam differential.

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a time or two but found little response when more than the 175 to 200 units we now use are put on."

It doesn't take a mathematical brain to figure how the Mississippi cotton farmer is making out in the marketplace. If he raises one bale of cotton to the acre and receives the average support price of 31 cents per pound, his gross for an acre is 31 cents times 500 which equals $155. Subtract his cost of production and you have his net. The advantages of irrigation, good field management, fertilizer, and being smart in the ways of the cotton plant can boost yield up to two bales and more.

Good cotton land can be bought in the Delta for around $300 an acre. The man who can raise two bales to the acre and keep his production costs at a reasonable figure doesn't take long to pay off his mortgage.

The Pruett brothers were original participants of the "Two Bales per Acre Contest." Those in the two-bale club who made three bales and more on five acres went on to compete for the highest yield in the county and state. The Pruetts came up with ten acres which is reported to have produced 51 bales. This plot was not in an official contest since they had won first place in every plot contest in the state. Many old cotton men will tell you that they never saw five-bale cotton. They point to the manner in which the yield of an acre is estimated: the number of plants to the acre are estimated, the bolls from a given number weighed, and the acre yield is estimated from this. Very often, they say, the boll count method comes out less than the actual weight of the cotton at the gin. However, the five bales the Pruetts grew to the acre were harvested and weighed and the yield was not based on boll count.

What does it take to raise five bales of cotton to the acre? Can anybody do it? Jahue Pruett admits that there are many things he doesn't know about his big yield, but he believes, under ideal conditions, five bales are possible anywhere. "First," he says, "you've got to have a perfect balance in moisture, fertilizer, and bug control. You've got to cultivate at the right time. You've got to watch the plant and know its needs."

Jahue Pruett says that the ten-acre patch where they grew their big cotton was likely a depression in a field which had been filled with the best of top soil brought down by the river from Ohio and Indiana and Illinois. It had everything, including drainage and fertility.

To sum up, Pruett gives his formula for big cotton yields: "1. Be willing to get your hands dirty. If we haven't a driver and the cotton needs working, my brother and I are the ones who get out there and work all night. 2. Subsoiling is one of the big factors in high yields here in our country. 3. Irrigation at the right time, and plenty of water. 4. Bug control and cultivation at the right time, and often if needed. 5. Plenty of nitrogen and a big population. 6. The best seed planted at the right time. 7. Watch your cotton every minute."

FRESH MILK FOR THE JUNGLE

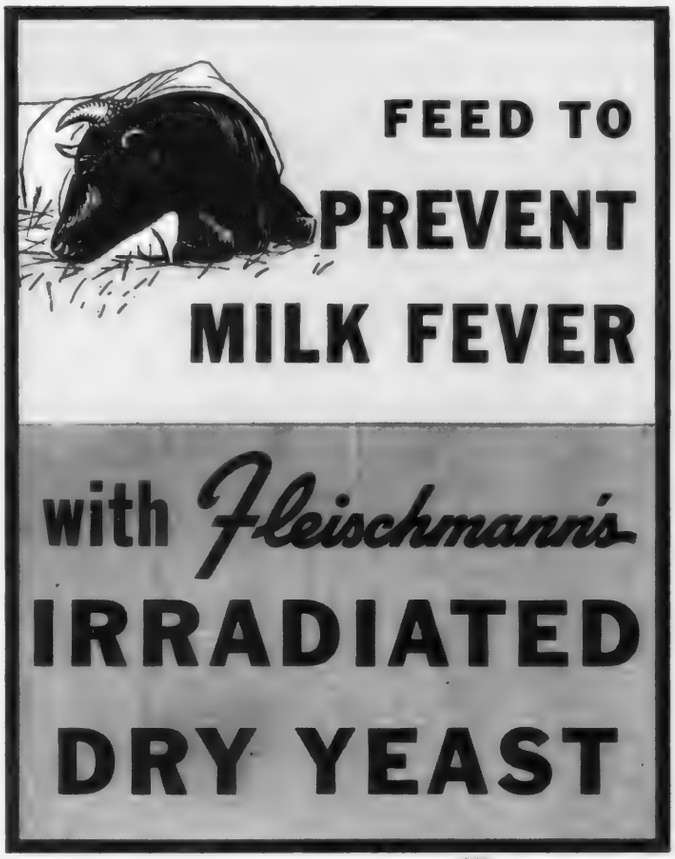
(*Continued from page* 66)

In the name of the American Milk Goat Record Association, of which I was then President, this cable was sent to Dr. Schweitzer:

> "American Milk Goat Registry Association sends birthday greetings hoping ship you herd fine milk goats letter follows."

The letter that followed explained to Dr. Schweitzer that we would obtain the dairy goats and send them if he wanted them.

About a month later, after Dr. Schweitzer had received our letter, he sat down and, as he had done with his correspondence for so many years, wrote a letter in fine French script. He explained the difficulties of the trip and that the goats might starve even after they reached the African coast, unless they were accompanied by a herdsman and feed for the trip up the Ogowe River. We were to find later that Dr. Schweitzer was right. Everything was different in Africa, including the transportation.



The results of the Ohio Agricultural Experiment Station research on prevention of Milk Fever have been published for a little over two years. Reports have appeared in many farm and dairy publications. As a result, more and more leading dairymen are feeding heavy doses of vitamin D five to seven days before calving to prevent Milk Fever.

This pre-calving special vitamin D feeding with Fleischmann's FIDY Type 142F is *low cost protection* against this costly disease*.

Now Fleischmann's FIDY Irradiated Dry Yeast, a rich source of vitamin D_2—and a source used in the Ohio tests—is being put into more and more specially medicated feeds. *Check the tag for vitamin D content when you buy medicated feed. Feeding instructions should indicate 30,000,000 units per day if the ration is designed to protect your cows from Milk Fever.*

FIDY itself is also available for custom mixing with your specially formulated feeds. (If you have difficulty in obtaining FIDY, write us direct.) You will also find that many leading dairymen set up a Milk Fever prevention program for their herd through their veterinarian.

This calving season, avoid costly Milk Fever losses. Take the first step. Learn more about this proved inexpensive method of Milk Fever prevention with Fleischmann's FIDY Irradiated Dry Yeast—a rich economical source of vitamin D_2. *Write for the free pamphlet described below.*

*Call your veterinarian *now* if cows are already down with Milk Fever. FIDY is a *preventive, not a treatment.*

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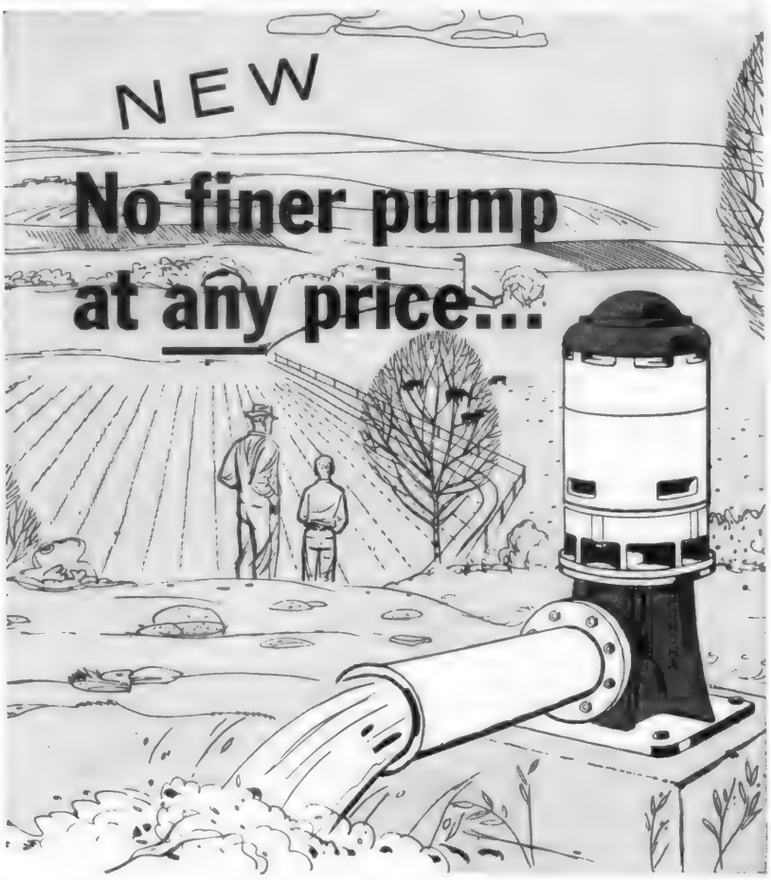
Since the diseases of the tropics and the tse-tse flies made it impossible for dairy cows to produce milk or even live long, we felt that the breed of goats most likely to survive was the sturdy Nubian. They were originally an African-Oriental goat that had been taken to England around 1900, where they had been bred with high-milk production goats to develop a breed that was a producer of fine-flavored, rich milk, while at the same time retaining their African type and ruggedness. Nubians are even equipped with long drooping ears to chase flies. If the goats were accompanied by a handler who knew modern veterinary medicine and techniques of spraying and parasite prevention, we felt we could set up a program at the hospital which would not only assure the survival of the herd, but maintain them so that they would increase and supply healthful goat milk for the patients and staff.

The goats for Dr. Schweitzer came from members of the American Milk Goat Record Association, Nubian breeders all over the country: Mrs. Alice Tracy in Los Angeles; Mr. and Mrs. Albert Bommer and James Morrison in St. Louis; Mrs. Cora Hill in Echols, Kentucky; Helen Hayse in Richview, Illinois; Mr. and Mrs. A. N. Anthony in Marysville, Ohio; Miss Helen Staver in Brattleboro, Vermont, and from the herd on our own farm, just east of Cincinnati.

Our problem of finding an experienced person to accompany the goats on their trip was solved when Dr. Byron Bernard, an old hand at African travel, agreed to do it. Dr. Bernard is the veterinarian for the Cincinnati Zoo.

A fund-raising campaign sponsored by the Cincinnati Zoo brought in a little over $2000 in the summer of 1956. We were still short of the total fund we needed for air transportation for our herd of 12 Nubian does and 3 bucks to Africa. Then unexpected aid came from Dr. Reginald Helfferich of the World Service Commission of the Evangelical and Reformed Church with headquarters in St. Louis, who had visited Dr. Schweitzer's Hospital at Lambarene just two months before. He opened a phone call by saying, "That is the one place in the world where they most need dairy goats. If you need money we will help



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you. For the babies and tubercular patients, fresh goat milk might mean the difference between life and death. Let's get the goats on the way."

Now that we were sure of enough money to make the trip, we still did not have our air transportation problems solved. Dr. Bernard decided to write the steamship lines which operate between the United States and the west coast of Africa. Delta Lines in New Orleans replied that they would be happy to transport the goats and Dr. Bernard to the port nearest Dr. Schweitzer's Hospital.

Then things happened fast and furiously. Studebaker-Packard offered the loan of a new one-ton truck. This was fitted out with two decks, the lower one a traveling barn for the goats. The top deck was used for supplies, and a zippered nylon tarp protected the entire cargo space. With weight no longer a problem, Dr. Bernard contacted pharmaceutical houses to ask if they would like to send medical supplies with our dairy goat shipment. Abbott Laboratories, Lederle, Merck, Sharp & Dohme, Parke, Davis and Co., Pittman-Moore, Schering, and Squibb gave generously of their drugs and antibiotics for the patients at Dr. Schweitzer's Hospital. The final count of the shipment that was loaded aboard the "Del Rio" in New Orleans came to over $20,000. Three days before the departure, a Chicago dentist, Herbert M. Phillips, heard of the shipment and flew to New Orleans to purchase a complete dental office and a 110-volt power plant to go along on the ship.

Ralston-Purina sent goat chow for the voyage. Livestock equipment, such as sprayers, hoof shears, and milk pails were assembled. Dr. Bernard included in his veterinary kit medicine for the other animals at Lambarene, for there were antelopes, dogs, sheep, gorillas, and chimpanzees to be checked over by a veterinarian.

The truck was driven to New Orleans and on March 30, 1957, was lifted aboard the "Del Rio," rolled to a sheltered spot on the afterdeck and secured. For 30 days across the south Atlantic the herd lived in the truck, being taken out daily for exercise on the deck. Two newcomers, silvery bucks, were born as the ship approached Dakar, French West Africa.

I flew to Africa, just two days on Pan-American's direct flight, with a day to spare at Port Gentil, French Equatorial Africa, where we were scheduled to unload for the trip up the Ogowe. But transportation in Africa doesn't always run on schedule; and the "Del Rio" was six days late because of thunderstorms along the coast as she unloaded at half a dozen ports on her way south from Dakar. We had missed the regular riverboat that plied the Ogowe so other transportation had been worked out. There were no roads on which to drive the truck, so Henry Rataboul, the French shipping agent in Port Gentil, said that he would supply a barge and a tug for the river trip as his part in providing fresh goat milk to Dr. Schweitzer's Hospital. I was also indebted to Monsieur Rataboul for bed and board while I waited. Since there was no hotel in this port town, it was fortunate that Dr. Schweitzer had written him that I would be there to meet the ship.

When the "Del Rio" came into Port Gentil, we lifted the truck, goats and supplies over the side with the ship's boom and winch. French customs were cleared with some difficulties on our drug shipment. They insisted on holding the drugs for three weeks because of a technicality over invoice forms. But they arrived safely and everyone was happy.

The natives along the Ogowe had seen some strange sights but it must have surprised them to see our spanking-new truck riding along the huge tree-lined banks on top of a barge. This tropical river runs almost on a line from east to west along the equator. It is the only source of surface transportation for the state of Gabon in the most primitive of the countries of the French Union —French Equatorial Africa. Along its shores live nearly every kind of animal, snake and insect, including some which are very unpleasant and dangerous. All night we chugged along through the tremendous trees of this strange and mysterious forest. Our ten native crewmen knew every turn and sandbar of the entire 118-mile trip. The goats and Dr. Bernard and I were all thankful for this for the only real danger would come if we became stuck on a sandbar. Twenty-four hours later, almost to the minute, we

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arrived at the hospital dock at Lambarene in the slashing downpour of an African thunderstorm. It was raining so hard we decided to leave the goats on the truck all night. They were well protected by the tight nylon tarps.

The greeting we received from Dr. Schweitzer when we met in the staff dining room is a memory I shall carry for a long time. His big and rugged face glowed in the light from the seven kerosene lights on the long table. For a long time he stood and held my hand in silence. The he launched into a stream of questions in German: "How had the goats withstood the trip? Would they be comfortable on the barge overnight? Had they been fed? Were we comfortable in our rooms?"

Only after we had satisfied his questions did he sit down at the table. This first meal, like all the others, was simple and wholesome. Usually there are five vegetables, raised by the hospital staff in their own gardens. A herd of native goats is kept to supply the manure for it. They are not eaten and they do not produce enough milk for their kids. There are always tropical fruits as part of the meals: bananas, oranges, lemons. There is very little meat or butter in this protein-short part of the world. Every other day there might be one meal with meat and butter; it is brought from Denmark or Holland.

The next morning, Saturday, Dr. Schweitzer and many of the staff members turned up at the dock for the unloading. There was a good supply of grain, about 1000 pounds, left from the trip and a half dozen good bales of Louisiana alfalfa. We had a stainless steel knapsack sprayer and a supply of spray materials. Drugs and medicines for the goats were received with special gratitude. Each goat was lifted off the truck and led up to the goat house with a pat from Dr. Schweitzer as they passed him. Then Dr. Schweitzer asked me through my constant interpreter, the Dutch nurse Mlle. Ali Silver, for a list of every person who had given to the project, because he wanted to write them all. It was unthinkable that this tired and overworked man in his eighty-

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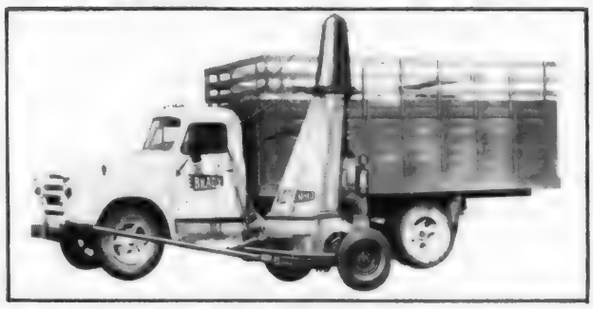

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third year should take time from his duties and his writing to pen notes to the hundreds of people who had helped in one way or another. Besides, many of the people who had given us contributions had not given us their names

For several days Dr. Bernard and I built feed racks and fittings for the box stalls in the goat house. We sprayed all of our goats for ticks and lice, and ended up spraying every native goat and sheep, all of the hospital dogs, and all of the patients' dogs. And there were many.

One afternoon we built a milking stand. We had intended making it from European packing crates of pine. But Dr. Schweitzer explained that the termites would eat it up in six months and he would have nothing but his African mahogany used. So we ended up with one of the finest milking stands in the world.

Then I taught Mlle. Ali Silver to milk in the stainless steel bucket we had brought. We discovered a fine fenced pasture that was unused alongside our goathouse, which stood about six feet above the ground. So it only remained to build a ramp and a door in the house in order to bring our goats down to it.

We found our goats ate the leafy bush called manioc with great relish. This is cut every day in the jungle and brought in on the heads of the native children for the native goats and also is used as a table vegetable for the native patients. The natives eat the root of the manioc. It is soaked for a couple of days in water, then baked in palm leaves, providing a basic source of starch. We are also indebted to Africa for much of our tapioca, which is made from the root of the manioc. There is also a native corn—maize—that our goats liked. Of course, the bananas, oranges and grapefruit were a great treat for them.

I feel that our twelve yearlings and bucks will not only survive and prosper, but with the loving care they will receive will increase and produce a good quality of nature's best milk for the babies and patients. Certainly they arrived in fine condition and seemed to be comfortable enough in the hot weather. Perhaps they sensed that they were returning to the continent from which their ancestors first started their trip to America via England. We know that nowhere in the world will goat milk be more appreciated. It is our hope that this project will provide the pattern for charitable groups in this country and abroad to send dairy goats to other milk-short areas of the world, and to areas of our own United States where fresh milk is needed.

GROCERIES & NOTIONS

(*Continued from page* 69)

"Old Man," I silently promised my fifty-year-old boss, "you're going to say that of me, too." Accordingly, every month I received intact, with not one penny deducted, my wages of $8.13.

J. C. Taylor sensibly closed down at nine p. m. Thus my hours ran roughly from 7:00 a. m., when I came to sweep the floor and light a fire in the hungry box stove, until the Town House clock in its thin, slow chime struck the conclusive hour of nine.

That gluttonous stove I must feed daily ate up 16-inch-long sticks of hardwood with rapid gulps, and following the second winter of my employment, every last stick fed into the iron creature was cut by me.

Youthfully confident, I made brags in spring that I would saw all the logs in the yard below Taylor's store within the space of one week. This would be twenty cords of wood. Release me from store duties; let Charlie Dowse, a good hand at filing saws, keep mine keen at all times; and I would do the rest. Mr. Taylor understood boys. On assuring me that I could never fulfill my brags, he knew the woodpile was already as good as stacked.

It was April, frost out of the ground, trees budding into tremulous green, our little Moose River splashing boisterously under the rainbow arch of the covered bridge my Temple uncles had helped build.

I picked up my razor-sharp saw and selected a piece of four foot wood from a forbidding pile. All too soon I discovered that

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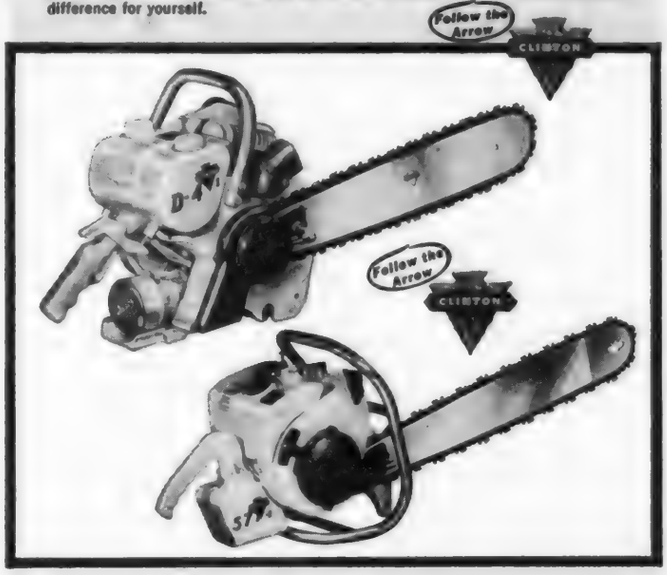
The words "Straightline Cutting" mean nothing to you until you try a Clinton Chainsaw yourself. You must experience and be able to compare the clear vision cutting—the ease of handling—the perfect saw balance of a Clinton. 5 models to choose from—both direct drive and reduction belt drive with patented TORSION DRIVE.

The Direct Drive Clinton feeds itself through the wood—no heavy pressure needed. The Clinton with Reduction Belt Drive lets you apply all the leverage or pressure you want in the cut. Patented TORSION DRIVE absorbs tremendous load shocks preventing engine damage and sudden load shocks.

Check the features below—then try the Clinton of your choice and see the cutting difference for yourself.



▼ QUICK STARTING ▼ FAST CUTTING
▼ LIGHTWEIGHT ▼ BALANCED
▼ EASY HANDLING ▼ LOW CUTTING
▼ TESTED, PROVED ▼ SERVICE EVERYWHERE
▼ REPLACEMENT ENGINE

Quick starting and Anti-Flood Designed Engine

This powerful, supreme quality, Clinton jewelled air-cooled gasoline engine with dust-proof, moisture-proof, high output magneto and sealed ignition points gives positive quick starts in any weather. Another plus in quick starting . . . the exclusive Clinton Recoil Starter needs only a minimum pull and prevents compression kickback. Contoured dome and porting plus hot fire ignition prevents flooding.

Grouped Controls

All controls are grouped for instant response to simple fingertip operation. Maximum safety provided by positive "ON-OFF" switch.

Series D4-1 available with 16", 20" and 26" guidebars. Also available with float-type carburetor (D3-1).

Series D2-1 available with float-type carburetor and 16" and 20" guidebars. Also available with diaphragm carburetor (D2D).

Series 877-1 available with 20", 26", 30", 36" and 42" guidebars or 14" and 18" bows. Available with ½" and 9/16" pitch chain.

Series 323A available with 20", 26", and 30" standard guidebars. Available with ½" pitch chain.

THE ONLY CHAINSAW WITH THE 15 MINUTE ENGINE REPLACEMENT

This means you never need an expensive, time-wasting engine overhaul. You simply bring your chainsaw to your Clinton Service Center and, in the time it takes to drink a couple of cups of coffee, the trained Clinton Serviceman installs a brand new engine. He gives you liberal trade-in for your old engine unit, too.

Clinton Machine Company
Dept. 154A • Chainsaw Division
Clinton, Michigan

Please send me your fact-packed, 3-color brochure on Clinton Chainsaws and the name of my nearest dealer where I can get a free Clinton Chainsaw tryout.

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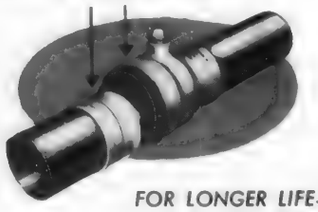

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Pittsburgh 9, Pa.

Charter Member—Sprinkler Irrigation Association

every log was as thick around as a stovepipe—some thicker. Others defied a full cut, unless I turned them over. Twenty cords in one six-day working week! Over three cords of hardwood a day, each piece cut twice in two, a pile 4 by 24 feet in size. Charlie Dowse better be good with his filing.

Word got out that Jim Frye was in back of Taylor's, sawing and sweating. Idlers came to gape and advise, friends to mock Little Jim desperately and publicly busy. Like an artist on a street corner, I must not glance up at spectators and become distracted. In silence, I sawed. Across the river in his frame house, Charlie filed. Harry and Fred Taylor were caring for their father's little roan in my place—I had a stove, not a horse to feed.

Early mornings, when plump robins were scuttling about our small common looking for grubs and bob-o-links were calling from meadows nearby, I was at my sawhorse. Late twilight found me still sawing, while the sun disappeared in a wedge of gold between two hills over Waterford way. It was a very weary lad who triumphantly flung down his tools on Saturday night and a grateful one when his boss said, "Don't touch another stick; the boys and I'll stack it." But I'd kept my word, sawed every last piece.

A shy stripling early in my employment, I was at some confusion if waiting upon the women folks, fitting them to ladies' high button boots; rolling out bolts of yard goods while trying not to rumple chambrais and print with my clumsy hayrube hands nor muss the handsome poplins; snipping off 18 inches of satin for a hair bow; measuring skrim and buckram; displaying whaleboned corsets nested in deep, slim boxes.

Townsfolk, at first, generally asked for Mr. Taylor to wait on them. Yet, slowly, I began to learn. When I was hired, deep red and blue, such as my sisters, Sabiny and Maryann, knit into mittens and mufflers, were about the only colors I could identify. Presently I could glibly recommend ashes of roses, Indigo blue, garnet, pistash green, and the popular seal brown. Once customers came directly to me, I knew I had caught on.

By then, I could deftly flip over a length of ribbed silk or bombazine or select the box of tortoise shell hairpins some woman needed for pinning on her Sunday-go-to-meeting switch of hair. I could advise a maiden as to a gold-plaited breast pin or locket that lay, with small wares, displayed in one of two glass cases.

Over these cases I daily fluffed my chicken feather duster. They were chockablock with a conglomeration of small items as divergent as penny candy and shaving mugs. The list of goods carried by a country storekeeper was astronomical. Cuff buttons and scythe snaths; common pins and mop pails; seeds and jackknives—on and on it went. Whips, brooms, axe handles, herd's grass, oil lamps—to believe

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Young Chukars 10 weeks old . . .
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Clear Brush, Fell Trees WHILE YOU RIDE!

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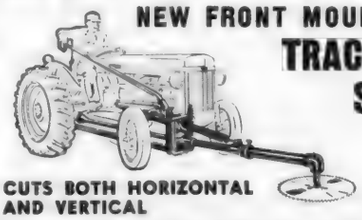

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"speed crops to market-farm fresh

—ON AN EATON 2-SPEED AXLE!"

—says farmer **VIRGIL DIEHL,** MIAMI, FLORIDA

"Barely a day passes when we're not delivering perishables to Miami markets, 40 miles away. Our schedule calls for a steady round of planting, picking, loading and delivering," says Mr. Diehl. "With an Eaton 2-Speed Axle on our Ford truck, vegetables move fast—they arrive farm-fresh without delay or spoilage.

"Frequently we have heavy flooding rains. Even then, our Eaton-equipped truck can maneuver into the fields and haul out a full load. In the low-gear range, the Eaton Axle comes through with the pulling power needed – power to take slick, slippery mud without bogging down. And when the truck is stacked high with perishables – beets, carrots, collards, turnips, cabbage – we don't waste time.

"Clocking 80 miles a day over the road could run gas bills high. But, our records show, an Eaton 2-Speed stretches a tankful further. On the way to town, over the highway we can haul at top legal limits with Eaton's high-gear range. When we hit mid-city traffic, Eaton's smooth shifting permits easier stops and starts, and doesn't jar the load. An Eaton 2-Speed is made for our kind of farming."

Whatever you farm, wherever you farm, an Eaton 2-Speed Axle makes trucking more efficient, more economical. Ask your dealer for a demonstration.

"MODERN PRACTICES pay dividends in farming," says Mr. Diehl *(left)*. "I have an up-to-date sprayer built onto a tractor to treat crops with the proper insecticides and fungicides. That helps keep my vegetables healthy. To deliver them to market in top condition, I can depend on my Eaton-equipped truck."

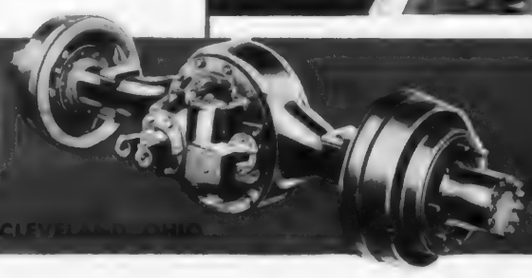
"QUICK TRIPS are essential," adds Mr. Diehl. "Otherwise, crops exposed to the hot sun lose freshness. Thanks to the Eaton Axle, we don't have to worry. There's no time lost on the road and, even while we're moving at fast legal speeds, engine RPM is low. That cuts down maintenance and engine wear."

"EATON'S VERSATILITY is what our farm customers like," claims Pat Haney, truck sales manager for Fred Warnock Ford, Inc., Homestead, Florida. "They need Eaton's low-gear pulling power for field work as well as Eaton high-gear range for speed and economy on the open road."

EATON

2-SPEED TRUCK AXLES

EATON MANUFACTURING COMPANY, CLEVELAND, OHIO



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MORE THAN 2 MILLION EATON AXLES IN TRUCKS TODAY

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Here is a low-cost, non-rotting, water impervious plastic film just right for literally hundreds of farm uses. Durethene® polyethylene film can help you farm better; it can help you farm for less cost and it can help you out in dozens of other practical and profitable ways. In fact—once you use versatile Durethene film, you'll see new applications for it everywhere you turn.

Upright Silo Cap

An efficient, easy to use, sturdy cover to cap silage stored in upright silos can be made from black 4 mil Durethene film. The cover is made to the diameter of the silo plus approximately twelve inches all around. Individual widths can be joined by stitching or sealing. The outer edge should be triple hemmed for added reinforcement. For extra weight, a length of galvanized chain may be hemmed around the cap edge.

Hay Stack Covers

Here's an application for Durethene film that can prevent loss of freshly cut hay. Tarpaulins made from waterproof Durethene film are excellent covers for hay stacks. The film keeps out rain and it can be used for both temporary and permanent storage. The film is extremely durable, yet it is so lightweight that two men can cover large stacks with little difficulty. Covers are reusable and will last for many seasons.

Want more Durethene FILM TIPS?

This Durethene polyethylene film handbook shows how to save time, money, and work on the farm and in the home. Over 50 idea-provoking uses. Send for your **free** copy.

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KOPPERS

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FILM

in such variety, one needed to see the stock in its odd justaxposition.

All day, townspeople and farmers, their wives and children, drifted in to buy or gossip. But after the early supper hour enjoyed at West Concord, six or eight men would settle down on a pair of simple benches, light up pipes or take out quids, and a chewing match (conversation and tobacco) would begin. Always the box stove was a focal point of the gathering in the wintertime—but winter or summer, the sawdust box set on iron feet was in demand by tobacco chewers.

When I became a storekeeper in Concord years later, I had had enough of wood cutting, so I installed a towering affair for stove coal that had a round wooden drum to use as a warming oven. The stove taught me several lessons—first, that the fiercely independent aged just won't admit that they forget—to do so is to admit to old age.

Orville Lawerence was a regular customer, an old man at the time I became a proud young storekeeper. One bleak day he tied his piano buggy to the nearest hitching post, stamped in shaking snow from his legboots, and placed his mittens on the stove drum to dry. When he left, carrying his groceries but not his mittens, I called to him as he opened the door.

"Mr. Lawerence, haven't you forgotten something?"

"I say—have I?"

"Your mittens, sir."

For a second he hesitated, glancing at the stove, then realizing this as a confession of forgetfulness, moved on out.

"I say—I'm not ready for 'em yet," came the face-saving reply. Extra steps to return and recover the mittens were worth proving he'd not forgotten.

On the lighter side was my experience with Cousin Elmer's young wife Ella who lived just over the store. Because my stove's damper had not been properly adjusted, gas built up inside the heater. One morning the gas blew up without warning, and following the course of the stovepipe, decided to explode right in the middle of Ella's neat bedroom. She came

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2-Color-Nylon is the most important improvement in cattle markers in many years . . . a new exclusive Dana invention (patent pending).

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No other marker made can even compare with this new 2-Color-Nylon for quality, durability, economy.

7 BRILLIANT COLOR COMBINATIONS

See these new markers illustrated full size in full color on the cover of Dana Catalog #95. This Catalog is FREE. Simply drop a postcard to

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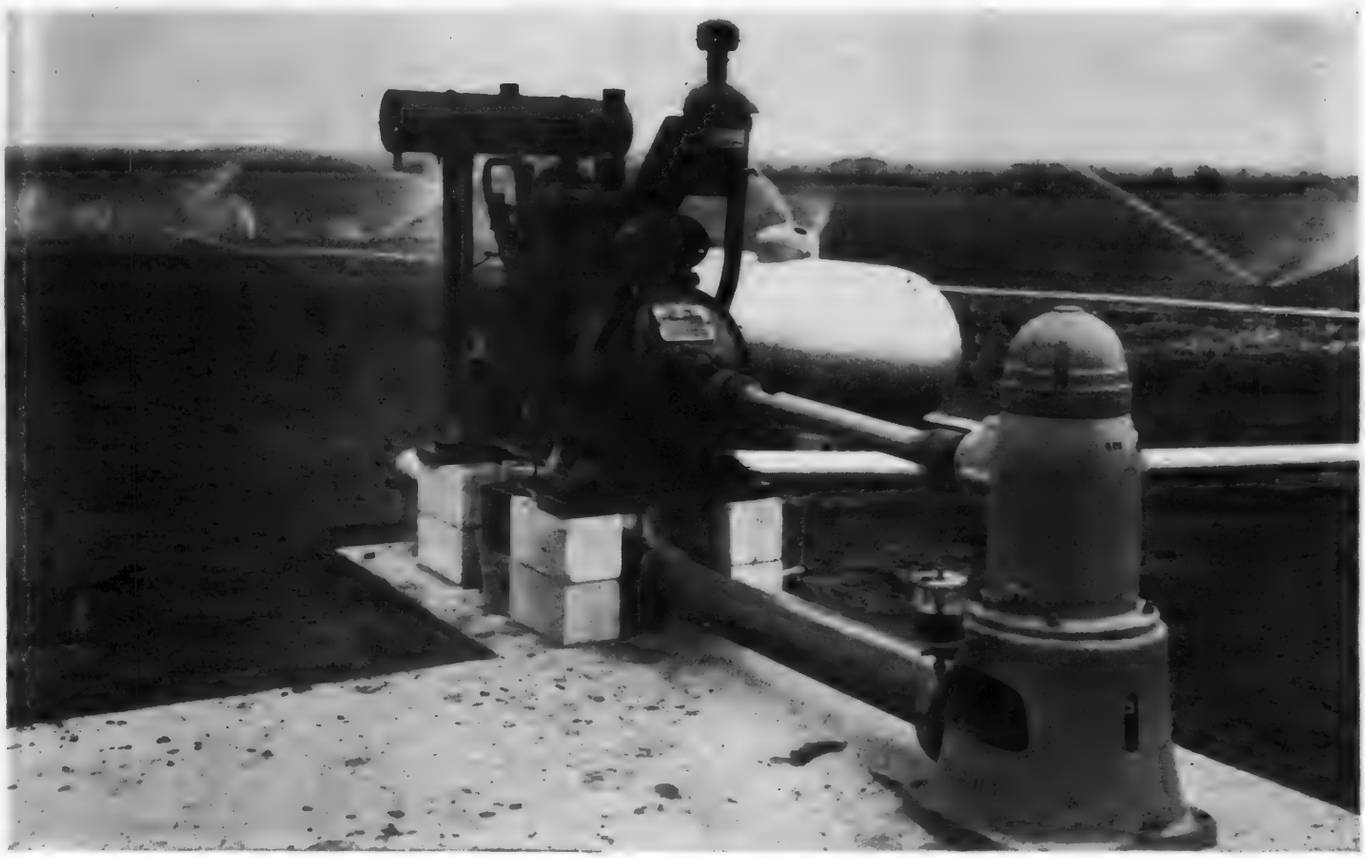
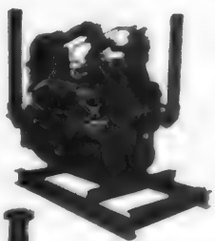


THIS 6-CYLINDER International U-450 carbureted power unit puts 600 gpm into a 54-nozzle sprinkler system irrigating 110 acres. It's one of 21 International engines available in 4, 6 and V-8 cylinders that operate on the fuel most economical for you to use.

Order "shower insurance" for '58 crops now



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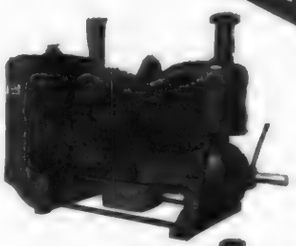
delivers up to 166 hp for day and night continuous load deep well irrigation pumping.



NEW UDT-1091 TURBOTORQUE DIESEL POWER UNIT
produces 250 hp @ 1,500 rpm complete with radiator and fan; 265 hp without fan.

INCREASED HP U-1091 POWER UNIT
rated at 232 hp @ 1,600 rpm on nat. gas complete with radiator and fan; 247 hp without fan.

Get yield-boosting water when you need it at lowest cost with a dependable International-powered irrigation system

Did heavy rainfall last April come too early to mean bumper crops for you this last summer? Then protect yourself right now against future weather losses. Place your order now for "controlled" showers during the entire '58 growing season by installing a yield-boosting, cost-cutting International-powered irrigation system.

Remember this. Whether you use sprinklers or surface irrigation, you need drought-beating International irrigation engines to give you more usable dollar-saving power on your pumps.

There are International irrigation engines sized for every system. You'll find them ranging from 10.5 to 232 net hp on natural gas or from 60 to 250 net hp in diesels to meet your gpm requirements.

And the irrigation power specialist who can help you right from the start is your nearby International Power Unit Distributor or Dealer. Consult him for a power, fuel, and cooling recommendation that's just right for your needs. He can match an International to any pump you prefer. And your pump power dollar also buys the finest after-sale service available when it's invested in International.

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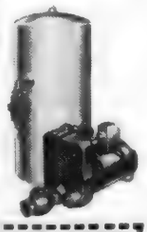
NEW LOW COST JACUZZI JETS FOR SHALLOW WELLS

Comes complete with close-coupled pressure tank. Just add pipe and plug in. Only one moving part for long life. No lubricating need.



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down at once to confront me as belligerently as a naturally gentle soul could.

"What have you done to my bedroom?" she cried out in dismay.

All I could do was offer to pay for removal of the coating of black soot showered from floor to ceiling—and watch my damper thereafter.

By the time I owned a store my cousin Elmer owned one also and there was a third merchant in town, H. F. G. Branm, who ran a store somewhat above us. All three of us inevitably stocked the long heavy woolen undergarment in two sections then favored by both men and women for winter wear. From this stock I was to learn a lesson in discretion. As a husbandly gesture, Harve Judevine elected to take home a set of nether garments from all three stores—perhaps planning to compare the merchandise. Wifelike, Mrs. Pratt repudiated the choice of her spouse. But not until months later—in a hurried trip to each storekeeper—did the buyer redistribute the goods. And then, not to rightful owners.

Elmer got a top piece of Branm's; this had become moth-eaten in places. I got the corresponding moth-eaten lower piece and a shirt of Elmer's while Branm got my full set.

Now I'd always kept a civil tongue in my head, as a young man should, while serving Squire Judevine, but I had no particular love for him. To accept mothholes along with belatedly returned goods was asking too much.

I confided to Elmer that unless I got my own garments back, I'd sue. Elmer must have quoted me and word been taken back to Judevine for he came in one day to say in farm-frank language it did not lie in me to do this. We parted coldly. Next day Branm brought back my rightful set, but with lofty righteousness I said, "Trot those down to Judevine—*he* bought 'em and *he* can return them *himself.*"

An old doctor in the store and my sponsor when I joined the Masons, spoke up. He advised against my act as Mr. Judevine was a man of influence; I listened, accepted the underwear from Branm—but not until years later did I fully appreciate the wisdom of his counsel.

J. C. Taylor, my first employer, had never trusted out. Nor Curt Stacey, a small storekeeper who had above the top of a time-silenced clock in his store the warning, "No tick here." But as I expanded, I began to let folks charge what they bought. Cleveland's panic lay on the land. Income began to fall below outgo. I had made a practice of presenting a trifling gift when a bill was paid, a bag of candy, a fat cigar. As the panic grew these gifts were infrequent.

"Give me a barrel of flour," a customer would say. Then as I loaded it into his wagon, "I'll pay ye later."

With hop farmers in the vicinity this had been a familiar way of doing busi-

an air compressor is a basic farm tool

Above is illustrated one of the many jobs that is performed by the *Campbell-Hausfeld Tankmobile Air Compressor* on the farm of William Brown, Rt. 1, Amelia, Ohio . . . cleaning the grain seeder. With proper accessories this portable *Tankmobile* can do a variety of jobs for you:

- Pressure-grease your machinery
- Spray-paint buildings and equipment
- Inflate vehicle tires for best performance
- Fog barn to eliminate insects
- Do many other time-and work-saving jobs

Ask your dealer to bring out a dependable *Model 15W Tankmobile Air Compressor* and show you how it will save labor and money. Write for descriptive circular. THE CAMPBELL-HAUSFELD CO., 181 Railroad Avenue, Box 1, Harrison, Ohio.

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"A necessary for good farming"

B. D. Harter of Oklahoma City, Oklahoma, has a Wood's 42-inch cut Rotary Mower-Shredder mounted on a Farmall Cub. And he says, "Have had no trouble with it—it's a necessary for good farming." That's because Wood's PTO-operated Rotaries shred stalks, brush, residues, prunings . . . cut small trees . . . mow grass, clip pasture . . . and mulch leaves. They do it faster, at lower cost, and with less maintenance than by other methods.

12 MODELS—42" to 114" Cut

42" under-mounted for Farmall Cub, Lo-Boy, Super A, 100, A-C G, M-H Pony and Pacer. 42" rear-mounted for Fast-Hitch Cub and Lo-Boy. 61" and 80" rear-mounted for Fast-Hitch Farmalls Super C, H, M, 200, 300, 400, I-300 (all use 3 pt. adapter), and all standard 3-point hitch tractors (Ford, Ferguson, Oliver Super 55, etc.). 61", 80", and 114" drawbar pull-types for any 2, 2-3 and 3-4 plow tractors. 80" offset model (2-3 plow) for working under trees. All have free-swinging, quick-detachable blades.

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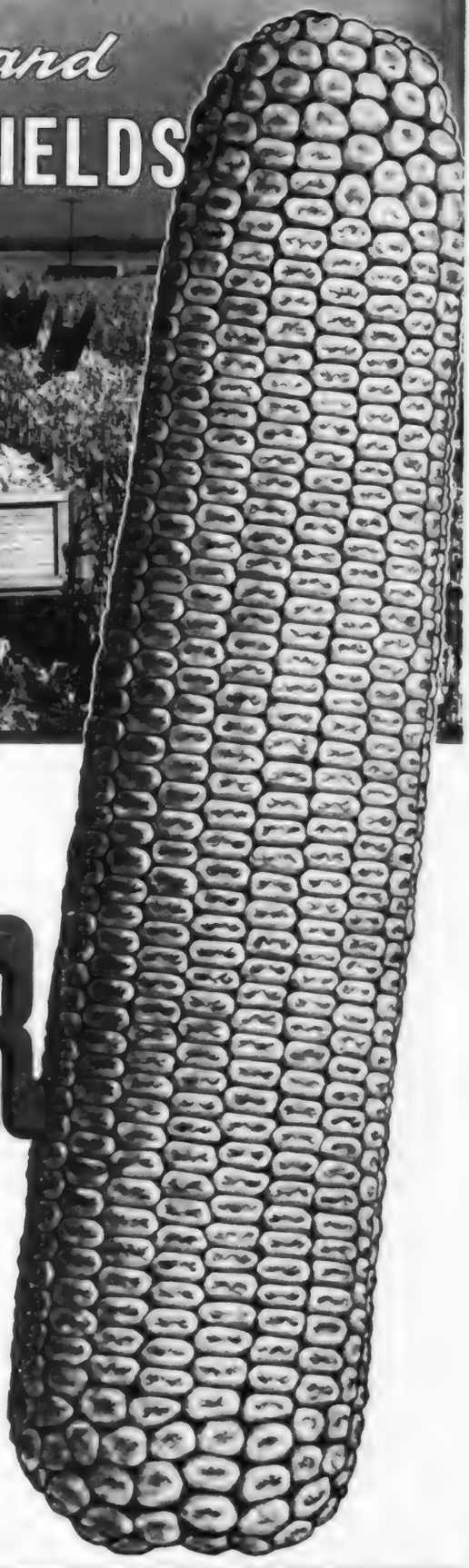

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Vigorous, fast growing . . . strong, stiff, straight-standing . . . clean, efficient picking . . . BIGGER and MORE PROFITABLE YIELDS of sound quality corn . . . all of these wanted qualities are yours . . . in greater abundance . . . in PIONEER.

PIONEER Hybrid Seed Corn is produced by the following companies:

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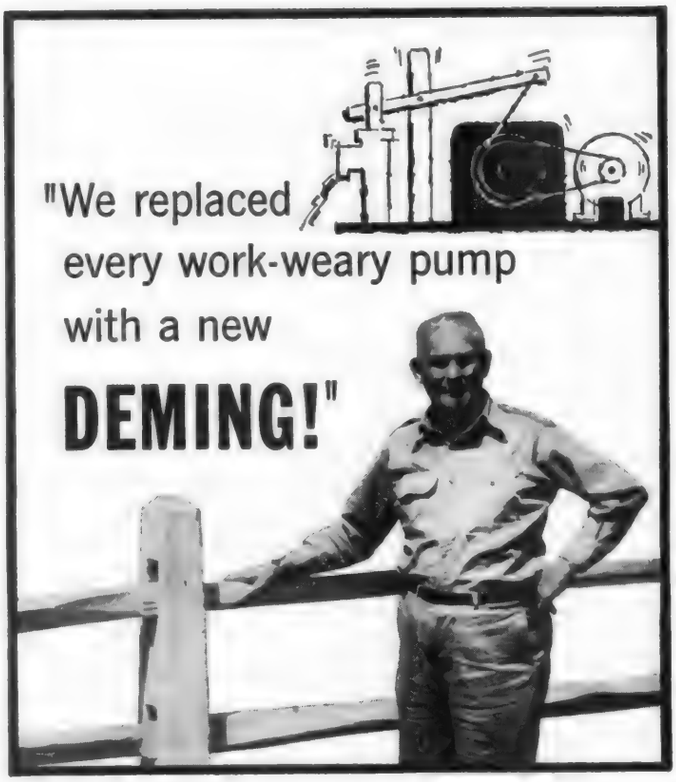

Work-weary pumps waste power and demand frequent repairs. Those old-timers are costing you money.

Replace them with up-to-date DEMING PUMPS! They make running water cost far less than inefficient pumps.

NEW
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New style impellers lock securely on shaft. Other modern features. Stainless steel and bronze construction. Quiet operation.

DEMING SUBMERSIBLE PUMPS operate completely submerged. Easy to install. Pump and motor water cooled and water lubricated. Never loses prime. Pumps are designed for 4-inch wells of 400 feet, or less, in depth. Full range of capacities from 190 thru 1500 gallons per hour.

Write for New Deming Submersible Pump Bulletin 6700-E

DEMING JET PUMPS AND WATER SYSTEMS

A complete selection of these popular pumps. Only two moving parts in pump. Easily convertible from shallow to deep well service. Pump can be placed over or away from well.

Single and two-pipe units. Full range of capacities from the smallest up to 3120 gallons per hour. *Write for details referring to Fig. 4963.*

SPECIFY **DEMING**
PUMPS AND WATER SYSTEMS
The DEMING Company • 510 Broadway • Salem, Ohio

ness, "Pay ye when I sell my hops" was as good as a bond. But this Cleveland panic was different.

Was Uncle Charlie, village blacksmith, really a prophet when he uttered his dictum against the Democrats on Cleveland's election? A diehard Republican, he sat down to read the day's news in tipped-back comfort. One glance at the news—Cleveland had actually been elected! Whang! Down came feet and chair legs as Uncle roared. "The country's gone to hell; and I can't help it!"

Certainly it seemed so to me as bills rolled in and wholesalers in Boston and Portland began pressing me. A backer wanted cash on his loan. The thought of contributing as usual to both Methodist and Universalist church funds was to think the impossible. Storekeeping, once my delight, was now my nightmare. "Never Trust Out"—why hadn't I heeded Mr. Taylor?

Farmers still drove round with no cash but "pay-ye-later" promises. Men still perched on countertops in the late evening to gossip and argue. If I turned out the lamps to be rid of them, it being summer, they kept on with their talk, seated outside on the family-size barrels of flour ($4.25) strung out from the store door in a long row. Plenty of goods went out over my counter—but no gold in any form seemed to come back.

There arrived a heart-breaking period of forced inventory and settlement, and the humilating public auction of my goods. "Finis" was written to my career as a storekeeper.

At last I locked my door for good. It was dark. Pleasant summer quiet lay upon West Concord. Tomorrow was only another day.

Four down trains from Portland would whistle at the crossing by the grist mill as usual. Four up trains would whistle in reverse. Horses from Ed Joslin's livery stable would clomp past to Uncle Charlie's for treatment for interfering. Farmers from the corner would drive up with their wive's grocery lists—kerosene—flour—stick cinnamon—a nipple for baby's bottle—but not to Jim Frye's store; he was done for—done!

I stuck the door key in my pants pocket for the last time—like a freed slave flung my hands high.

"Thank God, that's over!" I cried.

Yet I've always been glad I first tended, then owned, a country store for it taught me many valuable lessons I could never have learned from books.

THE AUTHOR: James David Frye was born in Concord, Vermont, in 1886. He attended the district schools and at 19 he went to work in a general store. He was a storekeeper for a few years but his life work, carried on for over 50 years, was scales. He went into the E. T. Fairbanks factory in St. Johnsbury in 1899 and there mastered the art of scalemaking. Later he went with the Buffalo Scales Company of New York, selling, installing, and repairing scales. He installed his last scales when he was 84 years old. He holds a United States patent for a computing scale and is among the first handful of inventors to patent a tractor tread device. He has lived in St. Johnsbury, not far from his birthplace, for 60 years. He and his dog, Whitey, are familiar figures in the streets of his home town.

DON'T SELL SHEEP SHORT

(*Continued from page* 61)

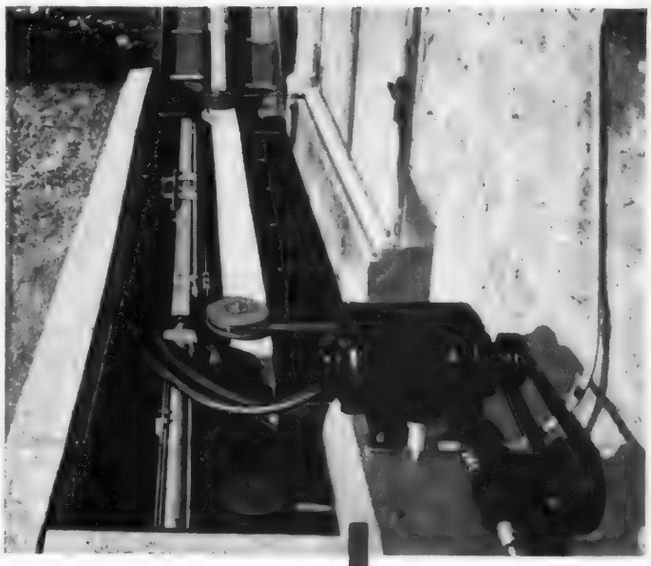
object of this treatment is to combat a second crop of stomach worms.

(5) If this schedule is followed, only the lambs will need drenching when they come into the barn for the winter. Phenothiazine can be removed from the salt at this time.

Robert Stark and his son, Roger, run a flock of 300 western ewes on their 320-acre farm near Traer, Iowa. To their neighbors they are known as a team that make few mistakes with their sheep. They run a 120 to 130 per cent lamb crop, shear 13 to 14 pounds of wool per ewe, and put 90-pound lambs on the market at 100 days of age. "That's the way to make money with lambs," Robert Stark insists. He takes advantage of the up-swinging market of early summer, sending his first cut of lambs to market in late May or early June and following through with the balance as they finish out, getting the tail-enders off the place by August.

How do the Starks turn out this kind of lamb? "We start out with the right kind of ewes and rams," Roger Stark says. "We like a ewe that is the product of a two-way cross. They breed these white-faced ewes to Columbia rams out on the range, then

New Power Choring from Jamesway



NEW

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most powerful, economical, strongest, safest barn cleaner ever built

- Big, husky ram with an 8-foot stroke furnishes 2-way power to gutter shuttle-cleaners. Flexible. Safe. Economical.
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- Shown above, a typical installation. Flexible Jamesway hydraulics let you install the motor, pump, tank and ram inside or outside, lengthwise or crosswise in your barn.
- See your Jamesway dealer for details now. Or write JAMES MFG. CO., c/o your nearest division office. Fort Atkinson, Wis.; Lancaster, Pa.; Los Angeles 63, Calif. Address Dept. FQ-37.

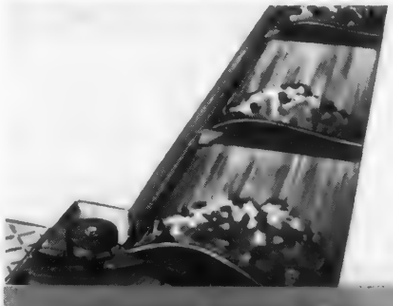
Now Jamesway engineers have taken the genius of Shuttle-Stroke design . . . combined it with the economy and flexibility of hydraulics to give you a brand new barn cleaner that power-cleans gutters *slick as a whistle.*

Famous push-pull action mixes liquids and solids, speeds them to the Liqui-Matic or Flat Bed elevator. High speed elevators can't possibly overload. Won't freeze up either — both models are self cleaning.

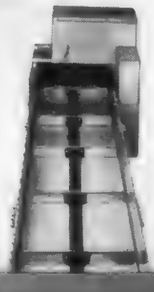
Unmatched simplicity and economy are yours with Jamesway's rugged, efficient design. The whole power unit consists of one motor . . . one pump . . . one oil tank . . . one self-reversing ram. It's the strongest ever . . . no gears, no pins, no sprockets to break. No worry about overloading — a safety release valve bypasses oil when pressure reaches 900 lbs. And all drive parts operate in oil for lowest possible wear.

See this revolutionary Piston-Powered Cleaner at your Jamesway dealer's now. You'll agree, no other barn cleaner can touch it for power, strength, safety and lowest possible cost.

JAMESWAY POWER CHORING MECHANIZES YOUR BARNYARD AS YOUR TRACTOR MECHANIZES YOUR FIELD WORK



New Shuttle-Stroke cleaner is smooth in action . . . cheaper to install. Outworks, outwears all others. Does 2 or 3 hours of hand labor while you do other chores. Here's power choring at its best.



Choice of two new all-steel elevators—Liqui-Matic and Flat Bed. Liqui-Matic runs at 8 times and Flat Bed at 4 times the speed of gutter shuttles. Both save the liquids as well as the solids — save the most valuable part of the manure.

$1.00 a day takes backaches away

For a small down payment and $1 a day, you can own any piece of Jamesway Power Choring equipment. Takes the place of $1 an hour hired man.

Jamesway

FIRST IN POWER CHORING

FOR POULTRY • FOR DAIRY • FOR LIVESTOCK

breed the ewe lambs of that cross to Suffolk rams. The ewes from that cross are the kind we like. Then we use Suffolk rams ourselves. We like them because the packers like them. They turn out crackin' good lambs, but you have to feed them and you have to get them to market early."

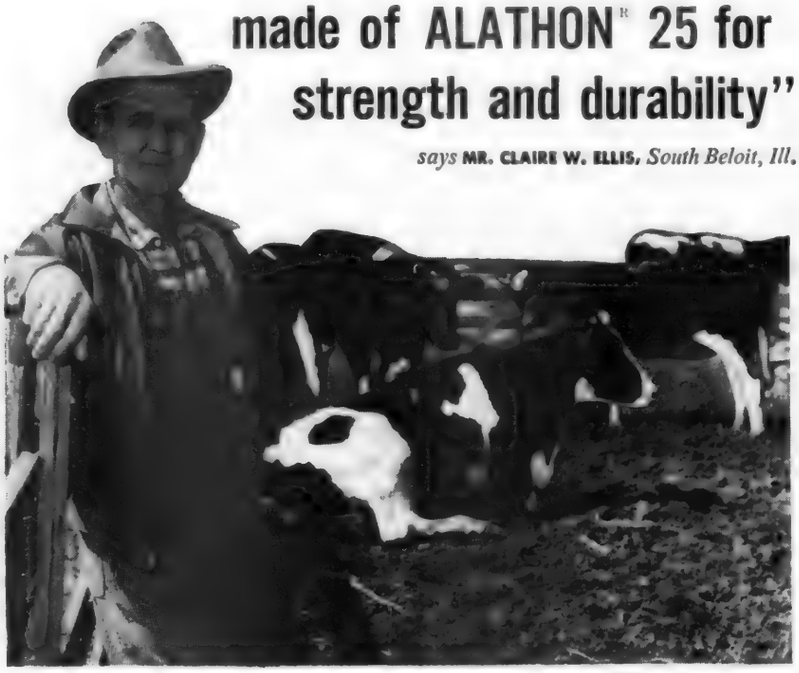
The Stark lambs are dropped in February and March. They run on brome-clover pastures with their mothers and they begin to get a grain ration in creeps as soon as they are able to handle it. This ration consists of 400 pounds of oil meal, 200 pounds of molasses, 15 pounds of bone meal, 30 pounds of salt, 30 pounds of Aurofax, and equal parts of rough cracked corn and oats to make up the balance of the ton. Stark estimates they eat about 2 pounds of this mixture a day and put on about a ¾-pound gain.

The ewes are wormed in the fall and spring and are carried through the winter on good hay and corn silage with some grain added to the ration a month before lambing. Stark cautions against overfeeding, particularly before breeding time. "We came up with forty dry ewes last spring," he notes, "because they ate too much. The pasture was getting short and we put them on a new seeding and that did it."

In many sections dogs have just about put the sheepman out of business, but the Starks have never had too much trouble with them. Like most of their neighbors

"You can't beat flexible pipe made of ALATHON® 25 for strength and durability"

says **MR. CLAIRE W. ELLIS,** *South Beloit, Ill.*



"I tried pipe made of ALATHON 25 because a number or people I know were using it on their farms and told me it was dependable. And believe me they were right. I've had pipe of ALATHON 25 in for three years now and have had absolutely no trouble . . . no pin holing, splitting or rotting. You can't beat flexible pipe made of ALATHON 25 for strength and durability."

Because ALATHON 25 polyethylene resin is formulated from pure materials specifically for pipe use, it provides advantages found in no other flexible pipe material.

Pipe made of Du Pont ALATHON 25 is extra durable... stands up under maximum pressure for longer periods, contact with corrosive soil chemicals and rugged use to which farm pipe is subjected. This means that when you install pipe made of ALATHON 25 you're assured of years of trouble-free service.

Make sure you're getting the best when you buy flexible plastic pipe. Look for the green tag with the words "Quality Pipe Made of Du Pont ALATHON 25."

(Pipe made of ALATHON 25 is available through Montgomery Ward and other dealers.)

There is a difference in flexible plastic pipe . . .

specify quality pipe made of **ALATHON® 25**

DU PONT

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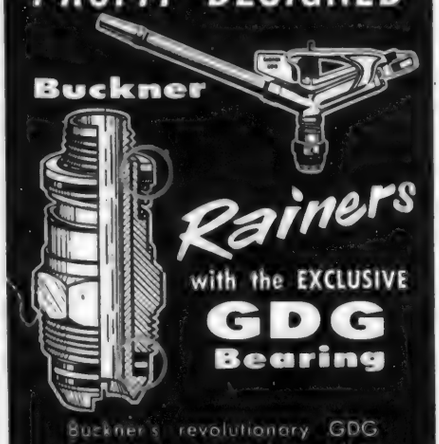

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they keep the flock in the barn lot at night. A good many sheep raisers have pole lights around the lot they keep on all night. One successful operator has a little trailer he can pull into a remote field and sleep with his flock if the dog problem gets bad. Another uses the subtle device of giving orphan lambs to his neighbors. If the neighbor's dog kills the lamb said dog is marked for extinction. Robert Stark remarks facetiously, "We insure our lambs against dogs, fire, and theft and that seems to do the trick."

A sharp contrast to the Stark program is the 700-ewe operation of Glenn Robinson and Earl Engelson, mentioned earlier. Not that it is any less precise, though Robinson refers to it as a "scavenger operation," it is just that the Robinson-Engelson team believe in feeding as little grain as possible and they do not sell their lambs until late in the year, long after the market has passed its peak. Those lambs are the talk of the Chicago yards, though, from the time the first load rolls in at International time, just after Thanksgiving, until the last cut goes across the scales around the first of the year. So excellent are they that they command anywhere from a $1.50 to a $5 premium over the rest of the market. This coupled with the fact the bulk of their ration has been pasture and cornfield gleanings makes them profitable.

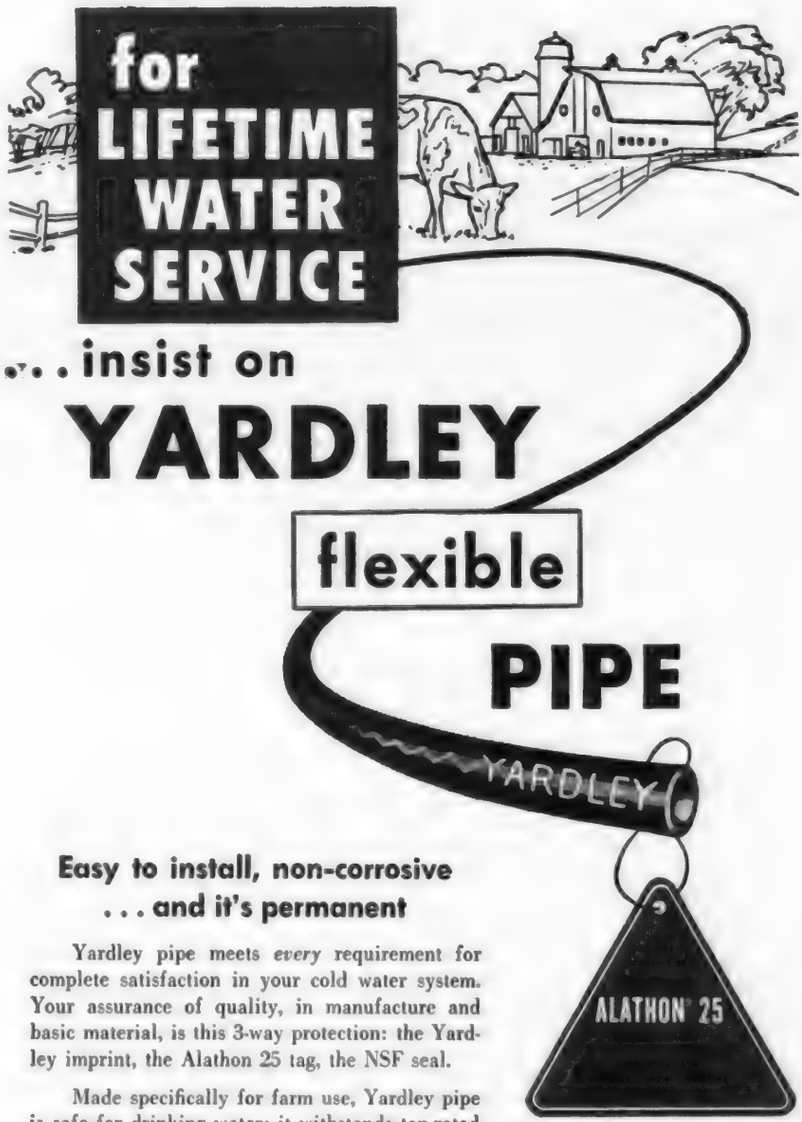
The refinements of the Robinson-Engelson system are so varied that trying to describe them is almost as tough a job as giving a blow-by-blow description of a three-ring circus. One of their basic rules seems to be never to be satisfied that they have found the answer. Robinson points out, "We tried a few Hampshire rams last fall. We've been using Southdowns right along, but we thought we'd see if maybe we couldn't get a little better lamb from these white-faced ewes by using a bigger ram. So four of the seventeen rams we used last year were Hamps. While we like to buy older ewes for our flock replacements because they lamb easier, we are trying some yearlings this year; and we've switched to white-faced ewes, although we'll still use the black-faced ones if we can buy them right.

"Getting back to the rams, we've used Shropshires at times, but we didn't like them very well. A Shrop lamb is just plain stubborn. He doesn't care whether he sucks or not.

"We never get rid of a ram, either," Robinson continues. "We use them till they die, and we find that if you run about forty ewes to a ram it keeps the lambs from bunching at lambing time.

"When we buy rams we look for individuals with a lot of size. They have to have depth and breadth in the rear end. When you take those lambs to Chicago it's the hind end that sells them."

How do they produce premium lambs? "Exercise does it," answers Robinson.



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Made specifically for farm use, Yardley pipe is safe for drinking water; it withstands top-rated pressures even after years of use; resists corrosive soil chemicals.

Run lines easily, quickly, at low cost wherever you need cold water — your home, milk house, barn, livestock, poultry and gardens. Flexible long lengths (up to 400 ft.) save fittings, time, money. Six sizes, ½ inch to 2 inches. Three working pressures, 75-lb., 100-lb. and 125-lb.

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This green tag *certifies* Yardley pipe is made of all-new resin formulated specifically for use in plastic pipe.

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"We see that they get all they can eat, plus plenty of water, shade, minerals and protein, and that's it. We call this a scavenger operation because basically all these lambs get is what they pick up out of the fields. We don't aim to feed any grain out of the bin if we can help it. We run the lambs in the corn fields in the fall—our neighbors like to have us turn our lambs on their fields because they will clean them up better than hogs will—and we send them to market right out of the field."

Robinson emphasizes the importance of vaccinating against overeating disease. "We give all our lambs 5 cc. of an Anchor Serum around the last of September," he says, "we let them have access to a hayfield or pasture, too, while they are on the stalk ground and we turn them out only for a little while at a time to start."

The combined Robinson-Engelson farms total better than 600 acres. None of the inside fences are permanent; they can tear down the wire between corn field and meadow in short order; and one of their tricks to cut costs in this department is to salvage and re-use every foot of used fencing in the neighborhood. If word gets around that Joe Green is going to have to tear out a piece of fence to make way for a road improvement, Glenn Robinson will be over in the morning to roll up that wire and cart it home on his trailer.

The around-the-calendar Robinson-Engelson sheep program goes like this: The ewes are flushed on red clover pasture or bean fields in October, care being taken to see they don't gorge themselves on the bean fields the first few days.

The rams are turned with the ewes about the 25th of October and are taken out around January 1. This brings the lambs between the middle of March and the first of May. "We don't want them any later than the first of May," Robinson says. "A late lamb is a wormy one. May and June lambs are no good."

Engelson, a bachelor and the senior partner of the team, sleeps in the barn at lambing time and it is his skilled midwifery that enables them to come through consistently with lamb crops around the 130 per cent mark.

The ewes get one pound of oats a day during the month before lambing. They are taken off the grain for a day or two right at lambing time so their milk production is not over-stimulated; then their ration is increased to 2 pounds until they are turned on good pasture.

There is no such thing as creep feeding in the Robinson-Engelson system though the lambs do get about 1/5 to 1/4 pound per day of linseed oil meal after they are weaned. The first week of March is shearing time.

Pastures are rotated every two weeks and since the lambs are kept all through the summer they are wormed once a month in June, July, August, and Sep-

tember with a 5 cc. dose of Jen-Sal "Trivermol." The ewes get 10 cc. of this same preparation in June and September. A mixture of 9 pounds of salt and 1 pound of phenothiazine is kept before the flock.

The lambs are weaned around the first of September and are turned on those good birdsfoot or red clover pastures. Then later in the fall, they start cleaning up the cornfields. This is a relatively critical period for the lambs will eat themselves dead in no time at all if they are not handled carefully. As was noted above they are vaccinated against overeating disease. They are also fed some corn in bunks before turning into the fields—the only "out of bin" grain they get; and they are only allowed in the cornfields an hour or so at a time until they get used to it.

In scrounging up and down the fields they get that exercise Glenn Robinson feels is so essential in building a firm-fleshed carcass. The first bunch will reach market weight of around 95 pounds just about Thanksgiving time. They are loaded directly from the fields without any further finishing and go to Chicago to entice the buyers with orders for high-quality meat.

And any sheepman who does his part and brings his product to market in good condition at the right time will find himself with a commodity he can turn at a nice price. Right now it is hard to get bearish on sheep. Don't sell them short.

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Modern consumer demand is for a meatier type beef animal. STEP AHEAD with Charollaise! Population trends and the taste of the modern housewife demand fine beef more economically produced — Charollaise is the answer!

Our breeding is designed to produce Charollaise from America's foremost bloodlines (Senor and Wotan). These performance-tested animals are bred for the fastest possible rate of gain, weight-for-age superiority and ability to convert feed into fine marbled beef with small waste fat and high dress-out percentages.

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Improved Butler Force-Aire System

This system dries grain to safe moisture levels and keeps it in condition during storage. Conditions the natural way with unheated air — and for pennies a bushel. Now, a new perforated floor for Butler grain bins makes Force-Aire drying and conditioning even more effective. It greatly improves distribution of the high volume of air delivered by the Butler Force-Aire fan. Butler's perforated floor is a complete system, with all-metal supports, that sets up easier and faster than previous models. No heavy ducting to move and man-handle. And it's easier to clean or disassemble for transfer to a new location. New catalog gives important details.

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HOW TO FIGURE FERTILIZER CARRY OVER

(*Continued from page* 45)

refuse behind to add 50 percent to the soil's humus supply.

Humus is the storehouse of soil nitrogen. It was not surprising, therefore, to find that the fertilized soil contained 35 per cent more nitrogen than the soil of the check plot. Part of this nitrogen had been left over from the fertilizer remaining in the crop refuse. And part of it had come from the air, through the greatly stimulated activities of nitrogen-fixing bacteria. Both the microbes in the nodules on the roots of the legumes grown and those living independently in the soil had profited by the fertilizer applications.

Some 50 years ago Paul Wagner, a well-known German chemist, pointed out that a crop recovers only from 10 to 20 per cent of the phosphorus from a broadcast application of fertilizer the first year after it has been made. This indicated a need to apply from 5 to 10 times as much phosphorus in fertilizer form as was expected to be contained in the hoped-for crop increase. And this has long been standard practice on intensively farmed land, both here and abroad.

Under such conditions it would be expected that phosphorus would accumulate in the soil. Examination of many samples of soil from intensively-cropped New Jersey farms has shown that much of this liberally-fertilized land now contains at least twice as much phosphorus as it did originally. The 1-ton-per acre applications of 5-10-5 fertilizer that were long the rule are now giving way to half-ton applications of a 10-10-10 grade, and without loss in yield.

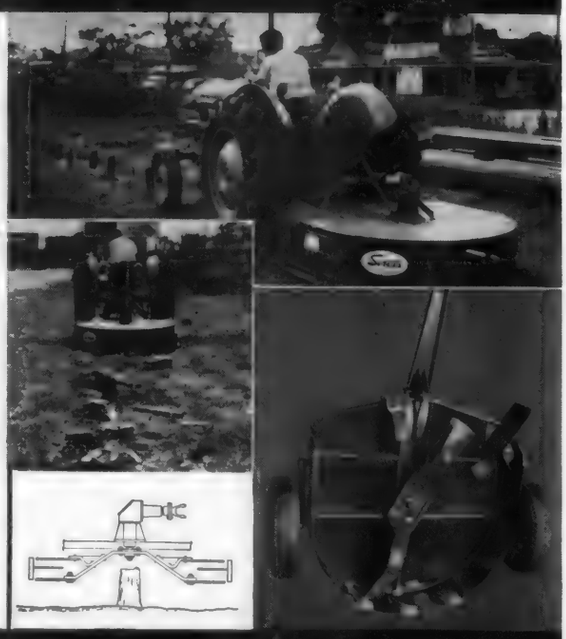
Accumulations of potassium in soils from heavy applications of fertilizer are not so dependable. Plants have the capacity to take up much more of this element than they need, and this is hauled away with the crop. Alfalfa, for example, may contain as little as 0.75 per cent potassium or as much as 4 per cent, depending on the supply at its disposal. About 2 per cent is all that is required to maintain good stands over a considerable period.

Nevertheless, applications of potassium will result in building up a reserve of this element in the soil. In a 10-year test at the New Jersey Station 1 ton of 4-8-8 fertilizer was applied per acre per year, in comparison with equivalent amounts of 5-10-10, 8-16-16, 10-20-20, and 12-24-24 grades. Crops were grown, harvested, and removed. Yet at the end of the test the soil on these plots, a Sassafras loam, contained two to three times as much exchangeable (available) potassium as had been present at the beginning.

The most striking residual effects from such accummulations of nitrogen, phosphorus, and potassium are found following row applications of fertilizer. They show up as dark-green streaks through any small-grain or grass crop that follows. They are particularly noticeable after poor crop years. Usually they disappear after the second crop season.

A second type of residual effect is found after long-continued use of fertilizers has built up the fertility reserves in the entire plow depth of soil to a high level. If, for some reason, no fertilizer is applied to the crop being currently grown, a good yield will be obtained notwithstanding. In such cases we are dealing with long-time accumulations of fertilizer-produced humus and of the fertility elements therein.

Servis GYRO takes on anything!



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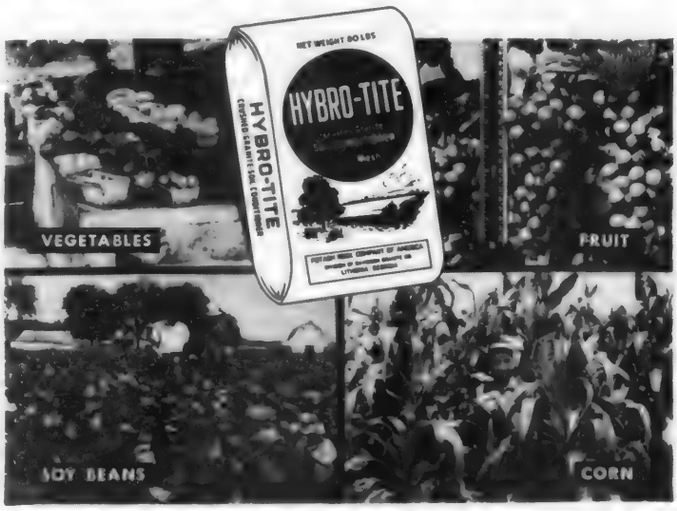

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Since we know how much fertilizer it takes to raise a 100-bushel crop of corn, for instance, why can't we state exactly how much in the way of applied nutrients remain after a crop has been removed? There are too many complications. The method of fertilizer application, such as whether broadcast or in the row, the season, the stage of the crop when the fertilizer is applied, the nature of the fertilizer materials used and a hundred other influences determine carry-over. In adjoining fields, of identical soil, with erosion, weather, and all other factors the same, adequate lime on one field as against too little lime on the next field can cause great differences in the release of natural or applied nutrients.

Two schools of thoughts about fertilizers have developed within recent years. One is that they are used to *fertilize the soil.* On this basis they are applied in such liberal amounts as to enrich the entire plow depth of the soil and to build up a considerable fertility reserve. Once this has been accomplished and yields are dependably high, only maintenance amounts of fertilizers need be used. These can be applied at any convenient time and in any convenient manner.

It is entirely feasible to fertilize once for an entire rotation, if conservation practices are not neglected. Nutrients will obviously get away if run-off is bad on slopes or if ground is left without cover in winter. In most tests, manure applied once in a four-year rotation has shown similar results in the long run as against splitting the manure between corn, small grain, and forage crops. As for heavy applications of commercial phosphate and potash once in a rotation, the practice is sound if preceded by soil tests and where the purpose is to build up the soil's reserve. Small starter applications will still be beneficial. Once-over heavy applications usually show longer-term effects if coarse rock potash and rock phosphate, both more slowly available, are used. Purchased nitrogen is too unstable in the soil to be applied in one large dose. It could cause lodging in small grains. It can readily leach or become unavailable. With nitrogen, timing is important, as every farmer who has side-dressed corn knows.

The fertilizing-the-soil concept has been in operation a long time in the intensively-farmed section around our large cities and in the truck-crop areas of Florida, California, and other states. This same concept is involved in the 1-ton-per-acre use of rock phosphate. Cyril G. Hopkins, pioneer advocate of the liberal use of this material, aimed toward doubling the phosphorus content of Illinois soils, and then maintaining them at that level. Similarly, he advocated liberal applications of limestone screenings, the coarse particles of which would last a long time in the soil.

The second school of thought on fertilizer practice conceives of the problem as one of *fertilizing the crop.* The idea here is to apply only enough fertilizer to meet the needs of a moderately good yield of the crop being planted. The application is made along the row so as to get as much as possible of it used that year. The system appeals to the tenant farmer. But the concept of fertilizing the soil might well be of much more interest to the tenant if, on moving off the land, he was compensated for the unexhausted fertility for which his farming program was responsible.

The British system of calculating compensation for fertility reserves, as developed by Voelcker and Hall, has been restudied from time to time. The latest report on the subject is contained in the Journal of the Ministry of Agriculture, Vol. 53, pp. 163-170, 1946. The essentials of the present evaluations, applied to this country, are shown in tables 1 and 2. They represent the thinking of a committee of nine prominent agricultural scientists in Great Britain after they had consulted with farmers' organizations and advisory services.

Compensation for liming materials, used in accordance with the recommendations of the British National Advisory Service, is based on an 8-year principle, one eighth of the delivery cost being subtracted each year after application. The compensation tables for manures, fertilizers, and liming materials are used only as guides, not necessarily being rigidly applied.

A fundamentally different approach to the solution of this problem was developed by Robert M. Salter and his associates at the Ohio State University and published in Extension Bulletin

Table 1

Compensation Allowances For Fertilizers
After Each of First Three Growing Seasons

Materials	After First Season	After Second Season	After Third Season
Nitrogen			
Inorganic*	None	None	None
Dried blood	None	None	None
Other organics	1/2	1/4	None
Phosphoric Acid			
Available‡	2/3	1/3	1/6
Insoluble‡	1/3	1/6	1/12
Bonemeal	1/2	1/4	1/8
Rock phosphate	1/3	1/6	1/12
Potash			
Available	1/2	1/4	None

*Such as sulfate of ammonia, ammonium nitrate, anhydrous ammonia, and urea.
‡As determined by official methods for superphosphate and basic slag.

Table 2

Compensation Allowances* For Purchased Dairy Feeds
Before and After One Crop Has Been Removed

Constituent	Before per cent	After per cent
Nitrogen	30	15
Phosphoric acid	50	25
Potash	60	30

*When fed under cover or on the land. One third is added for stock other than dairy cows or horses. When feeding is done under unsatisfactory conservation conditions, adjustments are made accordingly.

175, 1938. Careful study of soil and crop data from the several Central-West experiment stations enabled them to suggest index

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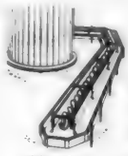

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values that took into consideration the crop and its management, the treatments given the soil, and the erosion control programs that were being employed. These values are shown in the table on page 45.

If one accepts these index values, he can calculate the net effects of any given system of soil and crop management on the fertility status of land. Thus, for a 3-year rotation of corn, wheat, and timothy, with the use of 5 tons of manure and 200 pounds of fertilizer per acre each rotation on land with slight or no erosion, an annual *deterioration value* of -0.95 per cent is assigned. For a four-year rotation of corn, wheat, alfalfa, alfalfa, with the use of ten tons of manure and 1,000 pounds of fertilizer per acre per rotation on the same kind of land, the annual *improvement* value would be +0.56 per cent.

To summarize, combining the findings of agronomists and farmers, it appears that one can count on a residual carryover of manures and fertilizers for at least three years; that any type of practice that materially raises crop yields will leave correspondingly larger amounts of crop refuse on and in the soil. Soil microbes transforms this refuse into humus. If one follows the practice of always using more fertilizer than the crop to which it is applied will need, he can push the fertility of his soil up to ever higher levels, with yields that correspond. The oftener legumes enter the picture, the larger the amount of manure available for use, and the heavier the rate of application of fertilizer the higher the acre yields of crops and the greater the accumulation of humus. "The way to grow bigger crops is to grow bigger crops."

THE AUTHOR: **Firman E. Bear, one of the leading soil scientists of the world, was born in Ohio, educated at Ohio State, and holds a Ph.D. degree from Wisconsin. After serving as chairman of the soils departments of West Virginia, Ohio State, and Rutgers, he is now retired, but continues a distinguished career as an agricultural consultant. He has served on the National Research Council, as a member of the Council of the American Chemical Society, and as president of the American Society of Agronomy, Soil Science Society of America, and the Soil Conservation Society of America. He is now a member of the Secretary of Agriculture's Advisory Committee on Soil Conservation. For the past 15 years a large part of his time has been devoted to the study of trace elements.**

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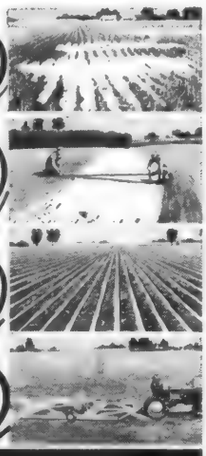

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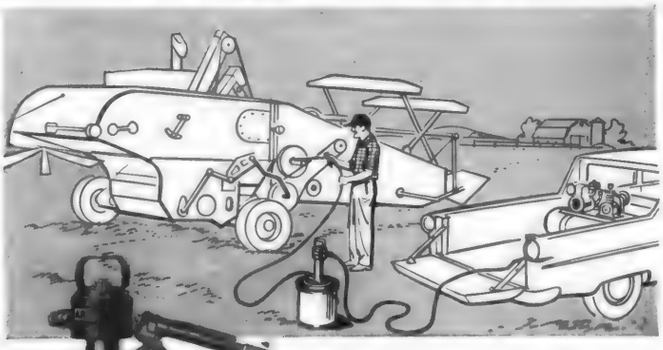

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MY HOPES FOR FARMING

(*Continued from page* 29)

acreage which in 1956 was calculated in accordance with the law to produce 10 million bales of cotton—last year this acreage produced 13.3 million bales. This shows how difficult it is to legislate production with a revolution taking place. Actually, if we had held down the acreage to what was appropriate with the amount of cotton we have on hand, the allotment would have been less than four million acres. However, the minimum acreage provisions required the higher acreage.

Twenty-five years ago, before the acreage control program, total foreign cotton production amounted to 11 million bales. Last year—after 25 years of easy living under the American cotton grower's price umbrella—foreign cotton production was 25 million bales. World production of synthetic fibers has grown during this same period from an insignificant amount to more than 14 million bales—an amount larger than our whole cotton crop last year.

We have all heard the argument that the price of raw cotton is so small a part of the finished product that the price of cotton could be increased sharply without reducing consumer purchases. One trouble with this argument is that most often it is the spinner rather than the ultimate consumer who chooses the fiber going into a given product, and the spinner will shift to the most economical source of supply with a relatively small differential. For many products, the competition between cotton and man-made fibers is definitely on the basis of price.

The argument has been offered that cotton consumption bears no relationship to price. The refutation of this argument lies in this simple hard fact: over a period of years, operating with a high support requirement, we have lost markets and our competitors, by underbidding us, have gained them.

Man-made fiber and foreign cotton production would undoubtedly have risen during the past 25 years even if there had been no program to restrict supplies and raise prices in the

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United States. But it is equally certain that the cotton program served to encourage our competition and speed its expansion.

Wheat is another example of both the revolution in agriculture and the effect of controls on our markets. Back in 1930 it took 67 man-hours to produce 100 bushels of wheat—now it takes but 26. Corn, incidentally, has dropped from 112 man-hours to 34 and grain sorghum from 102 to 29 man-hours for each 100 bushels produced. Back in 1925-29, before the control program, wheat brought in 7.5 per cent of cash farm receipts in the United States. After nearly a quarter century of controls and supports, this percentage has fallen to 6.1. From 1928-29 to 1954-56, our wheat production increased 18 per cent while production in the rest of the world increased 42 per cent. And much of our production during 1954-56 went into government storage or was exported only with the assistance of a subsidy.

By our high price support policy, we have destroyed markets, but we haven't had the courage to really apply the controls necessary to make our production equal our diminished market. If we had applied the controls which seemed called for by our surpluses we would have had, as I mentioned before, 3.9 million acres of cotton instead of 17.6, and our wheat acreage would have been around 13 million instead of the 55 million acreage which is the minimum under the law. Farmers would not accept, legislators would not vote, and administrators could not impose these kinds of controls.

And if they did impose such acreage controls, what would it mean to farm income? Look at some of our marginal farms today and you can see what happens when a farmer does not have enough land to farm efficiently. The acreage is so small that even if they were given 200 per cent of parity, they could not make an adequate living. And that is just about what would happen to a majority of our farms if their acreage was reduced so drastically.

These are some of the reasons I have recommended that we get away from levels of support prices that keep our farm products out of the market and acreage allotments that are taking away from the farmers their right to run their own farms.

My position is that the present laws have outlived their period of greatest usefulness and it is time for us to take another step forward. I have proposed that the law be modified to give the Secretary the right to use greater flexibility in applying price supports. The kind of flexibility which I would like to see in our price support system is already working very well for about 200 of our commodities. On these commodities the Secretary is given full discretion as to the levels at which support prices should be set. There are no formulae such as we now have with the six basic commodities. Congress has provided guide lines which, I feel, are valuable and should be retained. With such a system, we could support agricultural prices and still move the commodities into the market as we are currently doing with oats, barley, sorghum, soybeans, and the other commodities that are being supported in this way without acreage allotments and without surpluses.

Using the tools now at our disposal we can reduce the surplus and with such flexibility we could keep the surpluses from piling up again. We could place price supports at levels that would permit the commodities to flow into consumption rather than to force them into government warehouses.

When I speak of flexibility, I do not mean the elimination of price supports completely—I have never advocated that. In this uncertain world, the farmer is subjected to many hazards. One of the principal ones is the hazard of the marketplace. I think that a loan program and a storage program with flexible supports at a *moderate level* can be very useful in helping to promote orderly marketing and in helping to stabilize prices through the year. The actual level of support should be at such a level that in most cases it would be more profitable for farmers to sell their crops than to put them under loan. Supports should be high enough to bring the farmer a substantial loan if he wanted to hold his crops off the market at the time of harvest and needed this money to tide him over. With such

FOR YOUR TRACTOR OR TRUCK

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Finkie's Fact File

by M. W. Finkenbinder

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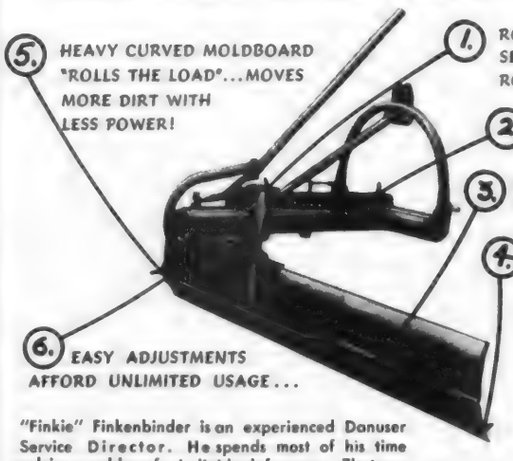

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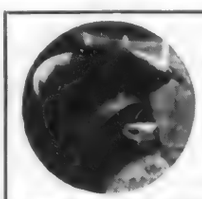
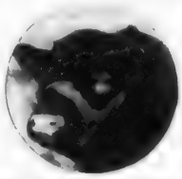


FOR GREATER BEEF CATTLE PROFIT



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increase weaning weights 50 to 100 pounds . . . increase calf crops 10 to 15 per cent . . . increase yearling weights 100 to 200 pounds . . . increase mature cow weights 100 to 200 pounds . . . increase grazing efficiency and traveling ability . . . increase milk in replacement cows . . . increase resistance to heat, cold, pink-eye, cancer eye and other infections . . . increase carcass value . . . and finally, increase market returns by bringing higher prices for weight.

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a program, the farmer would not have to move all of his products to market at harvest time.

The effect of such lowered supports would quite likely lower the unit price of several agricultural commodities. But it would not necessarily lower the farmer's income. A farmer's income is price times volume minus expenses. Each one of these factors affects the income. It is quite possible to lower income even with a very high price by reducing volume—through control programs or in any other way. I anticipate that with greater flexibility we will move in the direction of greater volume with prices that are competitive and which will permit the commodity to move into consumption. Such a movement will give more total farm income than under the present system even though prices may be lower.

My objection to the kind of price support we have had for the basic commodities is that it gives farmers not too much but too little. It gives them too small a market, too few of their own decisions, too small a net income, and too little chance to meet their competition at home and abroad.

What farmers need is a program which will add to markets, increase net income, liberalize the opportunity to make their own decisions, and protect their hard-won rights for equality of bargaining power.

I do not want to take anything away from farmers. Farm people and those who represent them should ask themselves whether a program of restriction and intended scarcity can ever mean as much in the long run as a program involving more freedom for market growth.

YOU CAN'T FARM WITHOUT A WORKSHOP

(*Continued from page* 35)

4. A table saw of the tilting arbor type (table remains horizontal for angle cuts). For extensive use on all types of cutting for construction and repair, the saw should have a 10-inch blade powered by a 1 h.p. motor. Many farmers, however, find an 8-inch saw with a ½ h.p. motor sufficient for most jobs. Both should have a tilt of 45 degrees; adjustable rip fence; miter gauge; guard with board splitter; sealed ball bearing arbor; V-belt drive; combination blades. There are a variety of available attachments which permit almost every type of cabinet work with a table saw, but this tool's greatest single value probably is its excellence for rip sawing. Price range for 8-inch model $50 to $75, plus about $35 for a ½ h.p. motor.

Roy Gundersen, the farmer with the well-tooled workshop mentioned earlier, stresses the importance of the tilting arbor. "It is much easier to adjust," he says,

WYETH ANIMAL HEALTH TOPICS

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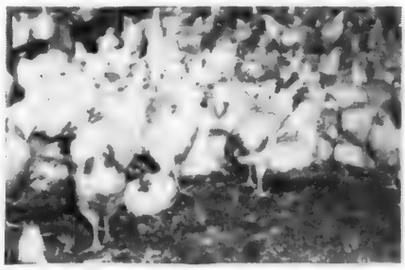

The powerful Bicillin concentrations in Bicillin Poultry Formula (DRY) mean a quick stop to poultry deaths—and a dramatically short treatment period.

Spillproof, breakproof Bicillin Poultry Formula (DRY) comes in handy aluminum foil envelopes, 25,000,000 units DRY Bicillin per envelope.

Just tear open, pour in drinking water. So easy, effective, economical!

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No wonder **TRIBIOTIC®* OINTMENT** works so well! Its exclusive triple-antibiotic formula and its rapid-spreading base mean *fast diffusion* and *powerful action* against udder and eye infections.

Available in single-dose tubes.

*Penicillin, dihydrostreptomycin, bacitracin.

ONE-SHOT INJECTION BICILLIN®* FORTIFIED Gives Up to One Week's Protection in Shipping Fever!

Shippers can certainly appreciate the advantages of a product that—with a *single injection*—protects their livestock for up to 7 days from the profit-crippling effects of shipping fever!

They have found—in Injection Bicillin Fortified—the drug that accomplishes this apparent miracle. The unique *dual* action of Injection Bicillin Fortified—high, immediate blood levels, followed by moderate, sustained levels—gives livestock treatment *and* protection, throughout the rigorous shipping period. Time-consuming multiple injections which fatigue livestock are *out!*

Note, too: Injection Bicillin Fortified is highly effective in *pneumonia, foot rot* and *navel ill.*

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Give to day-old chicks; it provides 300% more protection than *unvaccinated* birds have.

Won't affect egg production or quality, broiler weight or quality.

ATTENTION HOG RAISERS!

Streptococcal arthritis in hogs has a 2-step onset: (1) Temperature elevation; (2) stiffness and swelling of joints.

Occasionally, sub-normal elevation of temperature may obscure step #1, so that the first evidence of disease is direct joint involvement. Understandably, this may lead to confusion: Is it arthritis, or is it erysipelas?

Regardless of disease, there's one treatment that *can't* go wrong:

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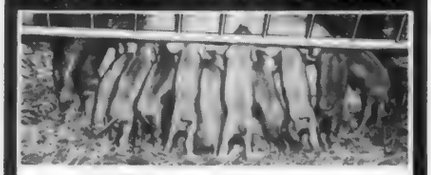

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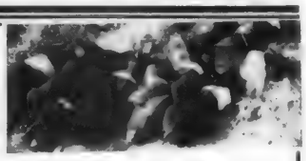

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"and you can do a much better job than on a model where you have to regulate the pitch of the table."

5. The radial arm saw is a tool which many feel is well-suited to farm jobs, particularly farm construction work requiring a great deal of cross cutting and compound angle cutting. A 9-inch model (9-inch diameter blade) is a handy size. Several controls permit setting the blade at any height or angle and positive stops are provided for the most commonly used angles. Most saws of this type can also be used with such accessories as abrasive, grinding, and buffer heads, dado heads, and sanders. The 9-inch saw cuts 2½ inches deep, cross cuts 15 inches wide on 1 inch stock and rips to center of 48-inch wide panels. A ¾-horsepower motor with a capacity of 3425 r.p.m. provides the power. Price range, around $250.

6. A portable electric saw. This tool is best suited for jobs out of the shop, because of its light weight. To meet most farm construction needs, especially when dealing with rough "home-grown" lumber, the saw should have a blade diameter of 7¼ inches; a vertical depth of cut of at least 2¼ inches and 1¾ inches at 45 degrees to zip through dressed 2 x 4s; no-load speed of about 5,500 r.p.m.; telescoping blade guard that operates automatically; universal electric motor; rip guide; weight under 15 pounds. Price range, $60 to $125, plus $15 to $25 for extra blades, including abrasive discs for cutting metal.

7. An electric arc welder (A.C. type) that can be used with tractor mounted or other portable generator for service anywhere on the farmstead.

Upkeep of an A.C. type welder is low, and the average power cost is less than $5 a year. Arc electrodes, when purchased in standard packages, are not expensive.

Recommended specifications: 180 ampere limited-input A.C. arc welder, operated from a 230 volt, single phase line and at least a 3 kilovolt-ampere (KVA) transformer; 10 feet of primary cable; 15 feet of welding and ground cable; insulated electrode holder; wall receptacle; ground clamp. Price range, $150 to $225, plus

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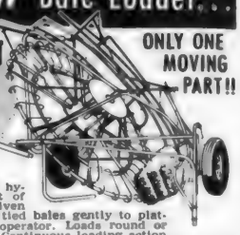

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head shield with No. 10 eye lens (essential for eye safety) plus electrodes and other supplies for welding and surfacing different types of metals.

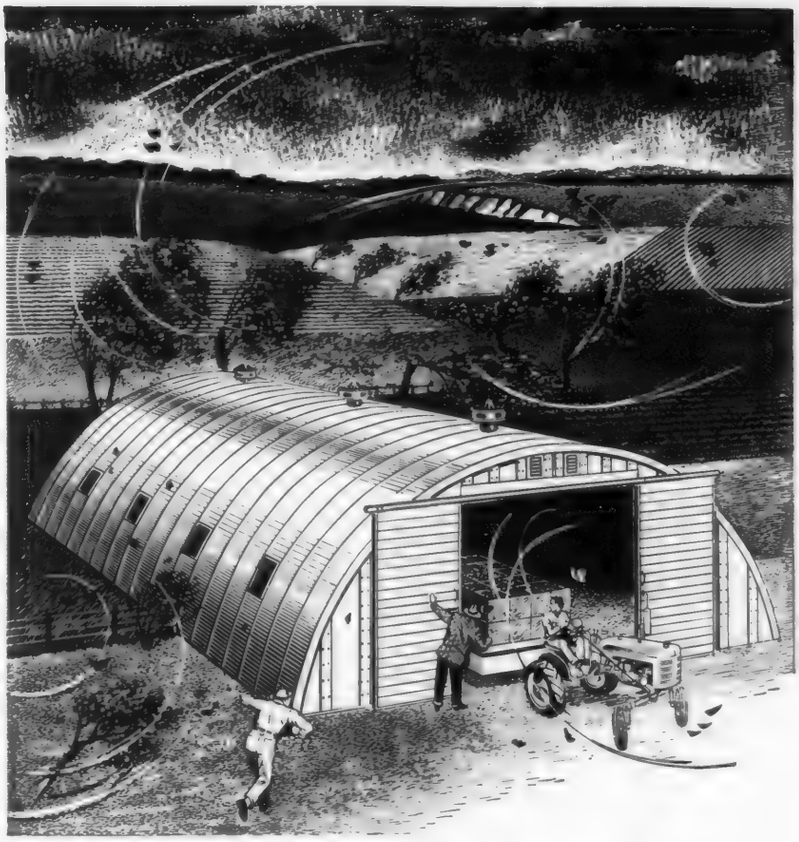
Many farmers shy away from welders because their use requires a course of instruction. But Howard Bonner has an answer for that one. "Somebody had to teach you to drive a car, didn't they?" he asks. "Why should a man refuse to use such a tremendously helpful tool as a welder just because he has to spend a little time to learn how. I went to night school over in Waukegan for six months to learn how to handle this thing, but that was sure time well spent. We do everything around here with our welder. Look at those safety plates in the barn over our barn cleaner. We cut those out ourselves last winter. We can repair broken frames and straps in a jiffy; make new equipment out of old parts; build wagon frames. There's just no end to all the work you can do with one of these things."

It is a good idea to check with the public service company before installing such equipment as an arc welder which requires a fairly large amount of power. The company can offer valuable advice on the installation and on the adequacy of the wiring and power supply.

8. An air compressor for inflating tires, cleaning equipment, pressure greasing and spraying paint, preservatives and insecticides. This should also be portable for use anywhere on the farm, and requires accessories for the jobs mentioned. A general purpose electrical outfit of ½ h.p. or larger is recommended. Other specifications, tank mounted; single-stage; pressure gauge equipped; actual delivery of about 2 cubic feet per minute at 1000 pounds per square inch pressure; weight about 150 pounds, with pressure feed paint tank of 2 gallons for long spraying periods. Price, about $125 to $160.

9. A portable lifting device, such as a floor crane or chain hoist on a trolley, for lifting truck and tractor motors and other heavy machinery. An example of the need is the fairly common practice of shifting a gasoline engine from a combine to a baler. The floor crane will serve lifting needs on most farms and can be constructed in the shop of pipe or heavy channel iron. Big farm shops that do extensive lifting can justify the cost of a trolley-mounted overhead hoist. Whichever is used, it should be able to lift at least a ton to a height of six feet. The A-frame for a hoist can be built with material usually on hand at a cost of about $25 or $35. Complete hoists vary in cost from about $75 to $150.

10. A bench or floor model drill press. The farmer who foresees a need for a very large amount of large hole drilling in steel, plus routing, mortising, contour sanding and similar jobs, can benefit by the accuracy and convenience of a drill press, equipped with a drill press vise that holds the material being drilled. Recommended is a 14-inch model, which means that the



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hole can be drilled in the center of a piece of material up to 14 inches in diameter. These usually have a standard chuck with capacity for ½ inch bits, but can be fitted with Morse taper shanks and sockets for drilling up to an inch or more. Price range, $150 to $250, depending on attachments.

A less expensive alternative is a wall-type post drill, which can be equipped with a small motor for about $65 and will handle most drilling needs.

Professor F. W. Duffee, head of the Agricultural Engineering Department at the University of Wisconsin, contends that a farmer needs at least a ¾-inch drill and has adapted the old blacksmith type post drill—the kind the smithy used to manipulate with sheer muscle—for use with an electric motor. This is one of the most used items in the University's farm shop and, according to Professor Duffee, a similar adaptation can be made for about $50.

If it is felt that drilling will not be too common a job around the shop the impact wrench mentioned above will be sufficient with its drilling attachments. It can be equipped with the Morse taper sockets for drilling up to an inch in steel and because of its portability can be used for work that cannot be brought into the shop.

11. A portable electric grinder. For the shop that engages in considerable welding, requiring a good deal of V-grinding, a separate portable electric grinder is worth the money. It should have a wheel size of 5 inches by ¾ inch by ½ inch; a no-load speed of 4,500 r.p.m. sealed bearings and adjustable guard. Price $90 to $105. Once again, an impact wrench can handle many of the jobs of this too, such as wire brushing, buffing and polishing, and grinding.

The buyer should note with caution the "no-load" speed of a tool before purchasing grinding wheels for it. Such wheels are built to operate up to certain "no-load" speeds, and are labeled with the proper speed. If operated at substantially faster speeds, grinding wheels might break up or even fly apart when in operation.

Many shop owners will eventually invest in other major power equipment as they extend their abilities. Jointers, band saws, hack saws, metal and wood lathes, radial arm saws, are expensive but worthwhile to the man who can make them pay for themselves through the savings obtained by their use. They are usually not in the "first buy" category. Other equipment, such as a steamer for cleaning engines and other greasy equipment and even the manure spreader, has high convenience value.

The hand tools which are essential to every shop are:

Grinding wheel dresser, crosscut and rip saws, wood and cold chisels, claw and ball peen hammers, hack saw and extra blades, screwdrivers, 3½ inch blade hatchet; gooseneck wrecking bar; adjustable and open end wrenches, wood mallet, 7-inch slip and side cutting pliers, 10-inch mill, round and flat bastard files, framing and combination squares, a one-quart blow

Tree Talk by Will Rusch

It seems like just about everything produced today from the A Bomb to Aunt Millie's pound-cake has a special formula. Therefore, it's only natural for foresters to have a formula or two up their collective sleeve which tree farmers should find mighty handy in running their woodlots properly and profitably.

One of these in particular is the "D plus" rule, a simple guide for determining the spacing between trees remaining after a thinning operation in a young stand. Here's how it works:

"D" is the average diameter of the trees to be left, and for trees six inches and over, diameter at breast height, the rule is D plus 6. This gives you the average spacing in *feet*. For example, if the diameters of the trees you're going to leave average 10 inches, then D plus 6 equals 16. So the average spacing between the trees to be left is 16 feet.

This rule is good for most types in the eastern United States, on all sites, for all species and for all ages.

In the West, the principle of the "D plus" rule is the same but the six is reduced. Here are some typical examples:

Pure ponderosa pine — D plus 4.
Mixed conifers (white pine, larch, Douglas fir, ponderosa pine) — D plus 3.
West Coast Douglas fir and redwood — D plus 2.
For sapling stands under six inches diameter, use D plus 4 in the East, and D plus 2 in the West, unless advised otherwise by local forestry authorities.

When the first power chain saw was built a number of years back, I'll bet its inventor never dreamed the day would dawn when it would become as much a part of the modern farm as the tractor. However, you can take it from R. K. Mitchell, owner of a large farm at Aladdin, Wyo., that the day of the chain saw is here for sure!

Mr. Mitchell's farm is on rough, hilly ground with a large portion of it covered by timber ranging from hard oak to soft pine. In 12 months, starting last Spring, he made an extra $2,700 with his McCulloch chain saw, just using it around the farm. This is the way he puts it:

"My McCulloch is the most essential piece of machinery I own. I use it for rough cuts in building sheds, cutting out fence lines and posts, clearing roads of deadfall timber and a number of other jobs where speed is important.

"I've used several makes of chain saws, but McCulloch tops them all for its many different uses, overall performance and ease in handling over rough ground."

And judging from the way McCulloch saws are growing in popularity every day, it seems that farmers everywhere agree with Mr. Mitchell on the value and usefulness of this modern farm tool.

Speaking of McCulloch chain saws, there's a new illustrated folder off the press which describes the full 1957 line — and it's yours just by dropping me a post card. Send your card to Will Rusch, McCulloch Tree Topics Bureau, Los Angeles 45, Calif., and I'll see that you get your free copy promptly.

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torch, home-made anvil, oilers and grease gun, center and drift punches, tin snips, draw knife, 6-foot rule and 50-foot steel tape measure, oilstone, 18-inch monkey wrench, 18-inch pipe wrench and cutting dies, and a level.

While the biggest lump sums for farm shop equipment go for power tools and other large implements, probably as much or more money is spent over a period of years for nails, nuts and bolts, paint and spare parts.

The purchase of fairly expensive tools is governed by expected use, and parts purchases should be considered on the same basis. Many successful farmers keep tab on machinery parts that are frequently broken or lost in operation. When they pick up a replacement, they buy one or two extras.

With that procedure, their parts bins eventually become filled primarily with the articles most likely to be needed, and least likely to merely occupy space.

Dies for threading pipe, as an example, come in sets from ⅛ inch to 2 inches. Since the more common piping systems involve only three pipe sizes—½, ¾ and 1 inch—it is smart to stock only those three sizes, and pick up other sizes only if specifically needed.

A desk or office is mighty handy. Catalogs, equipment, and parts inventory, machine manuals, and other literature should be kept in one spot for ready reference. Room may also be needed to lay out and study plans and blueprints.

Good farm shops are not made—they grow. Roy Gundersen admits it took him some 12 years to acquire his assortment of tools and he is still adding to the collection. But if a man knows what he wants in his shop, plans in advance, starts out with a few basic items and purchases his additions judiciously he will soon have a shop he will not only be proud of but which will prove one of the most valuable investments on the place.

THE AUTHOR: After graduating from the University of Wisconsin, Don Burrowbridge spent nine years as Agricultural Sales Engineer for the Commonwealth Edison Company in Illinois. Since February, he has been director of the Thor Research Center for Better Farm Living at Marengo, Illinois. Burrowbridge is married, has six children, and operates a small farm.

For further reading: "Farm Shop Skills in Mechanized Agriculture," by H. O. Sampson, A. S. Mowery and H. L. Kugler, American Technical Society, Chicago, 1955. "Serving and Maintaining Farm Tractors," by E. J. Johnson and A. H. Hollenberg, McGraw-Hill Book Company, Inc., New York, 1950. "Farm Electrification," by R. H. Brown, McGraw-Hill Book Company, Inc., New York, 1956.

BOARS, B'ARS AND HOUN' DOGS

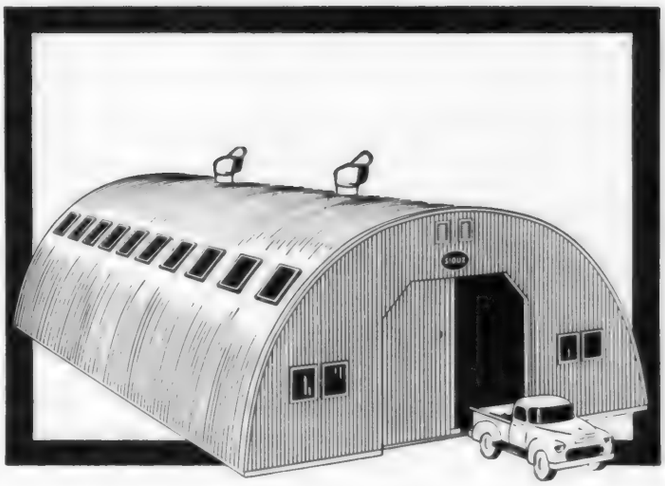
(*Continued from page* 31)

over the winter, and sometimes two or three litters will run in a pack. However, since they have been hunted and dogged considerably, it is rare to find them in packs in recent years. They have poor eyesight, but very keen hearing and sense of smell. When flushed they take off at a fast lope and can run all day without tiring. Some had been pursued for twenty miles before being brought to bay.

They are mean customers with their tusks, and dogs that live long enough to learn are very wary when they are at bay. Their thick skin makes them almost impregnable to the ordinary assault. When wounded or cornered, they are the fiercest of animals, although they ordinary give man and his dog a wide berth.

They usually feed in the late evening or early morning, laying up in the daytime in the laurel thickets. Their feeding range is wide, from three to twelve miles in a day, depending on the supply of mast.

They live on mast, grubs, roots, snakes—almost anything that comes their way. They are particularly fond of white oak acorns. Their diet gives their flesh a nutty, sweet flavor which is highly regarded. While the flesh of domestic male hogs is too strong for ordinary use, the male wild boar, regardless of his age, is usually good eating. They put on no fat beneath the skin, but after a good mast year there will be fat around the kidneys. They do well in captivity, and there are a good many of them trapped for the winter's meat supply of the natives. The female will sometimes desert her litter if she is disturbed by a pack of dogs and will not return to them. Almost everybody in



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you cut 'em all down to size with a Brillion

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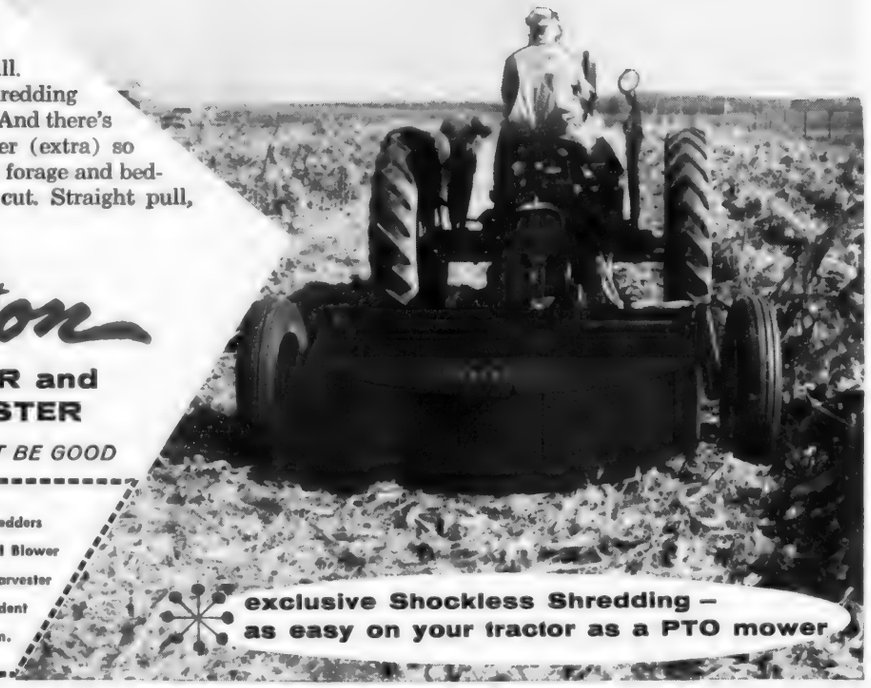

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the mountains has at one time or another raised one of these orphans.

Hunting wild boar, or pig sticking, was a favorite sport of the Middle Ages in Europe. Medieval knights rode their charges into the forest and closed with the boar, using a long lance as a weapon. The boar's head was considered the most delectable part of the animal and was a traditional Christmas dish. The top of the skull was lifted, the brains seasoned, the whole head popped into an oven. The brains were served "en casserole."

The men of Tennessee and their hunter guests use high powered rifles and a special breed of dogs to track and bring the boar to bay. There is a limited open season on both bear and boar in October. The first organized hunt in Tennessee was in 1939. Since then the conservation departments of Tennessee and North Carolina have collaborated with the National Forest Service in supervising the hunts. Depending on the current numbers, permits are drawn from a hat and the lucky applicants organize the hunts. A hunting party may range from twenty to a hundred hunters, with a guide and his pack of dogs. The hunters take off in Jeeps for the deep mountains from Tellico Plains, ten to twenty miles, and the dogs released. Each hunter in Tennessee buys a hunting license, which costs three dollars (resident), and a big game stamp, which costs five dollars. The hunters are

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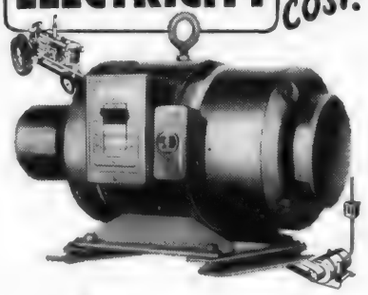

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usually out two days and pay the guide $100. This includes his dogs.

As soon as the hounds begin to tongue, the hunters follow. The chase may be short, or it may lead twenty miles over the roughest kind of terrain. There may be a boar at bay at the end of the chase, or there may be a bear. A bear or a deer are predictable—they run away in a straight line. But a boar may run in a circle, zig-zag, or bee line for the next county.

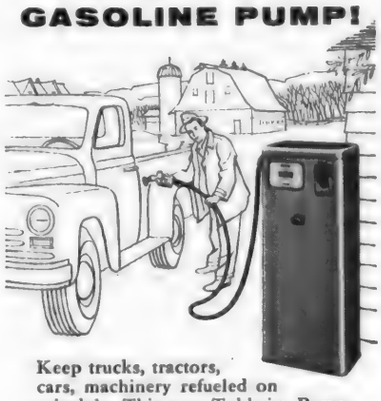
Last year there were 22 numbers drawn from the hat. A few of the parties were skunked, but most got either a bear or a boar, or both. The bag limit for a party is two bears. There is no bag limit on boar. The game is rough dressed on the spot, loaded on a mule or a jeep, and taken to a butcher shop, usually Benton Byrum's, where it is dressed for the pot.

The success of the hunt depends a great deal on the guide and his hounds. Lucky is the sportsman who can obtain the services of such men as Bert Woody, Bill Thomas, Austin Akins, Benton Byrum, or the Rev. Leonard Walker. Bert Woody damaged a leg in a logging accident and is in semi-retirement. Rev. Walker is a be-spectacled Baptist minister, whose tall tales of the hills are accepted as gospel truth. Good mountain men all, wise in the ways of boar, b'ar, and houn' dogs.

Any kind of a dog will do for boar hunting, provided he has the proper ruggedness, a keen nose, and the courage to grab a boar or a bear by the scruff of the neck and hang on. Most of the bear and boar dogs have a good percentage of hound in

Modern farms need this

NEW ELECTRIC GASOLINE PUMP!



Keep trucks, tractors, cars, machinery refueled on schedule. This new Tokheim Pump, spotted in your farmyard, assures greater storage, fewer deliveries, real savings! Features easy-to-reach nozzle, easy-to-read dial, plenty of hose. *Safely* delivers 10 gal. per minute. UL approved. Ask your Tokheim representative or your oil company about this modern work-saver!

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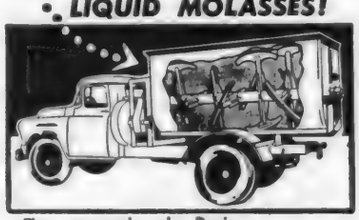

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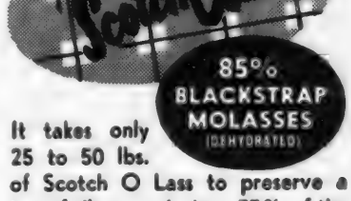

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their make-up. One of the favorite breeds is the Plot hound, named for the family in North Carolina which developed him.

The Rev. Len Walker tells how this breed came about. "These Plot boys," he says, "had some old cur dogs and they were pretty good bear dogs, but they didn't tongue enough and you couldn't tell where they were at when they got out of your sight. Then one day there was a fellow came through the mountains there and he had a bitch and she was a good bear dog and she tongued a lot. The Plot boys says to themselves, 'This bitch has got just what we need in our curs.' So they got the bitch and crossed her with their own dogs and up comes the Plot hound."

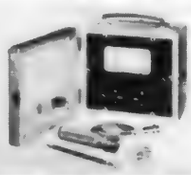
The Plot hound is a black and brindle dog, that is, with brindle head and legs. And he's chuckle headed, according to Bert Woody. He'll weigh 65-75 pounds and can take and give a good deal of punishment. He has a broad shoulder and a good nose and soon learns how to keep out of trouble and at the same time keep a bear or a boar at bay. The Rev. Walker says his favorite boar dog is a Plot hound with a touch of Airedale in him.

Bert Woody had two of the most famous Plot hounds in the mountains, Jeff and Lead. Bert taught Jeff and Lead tricks which often mystified the city slickers whom he guided. One was to pray before a hunt. The two dogs were primarily bear hunters, and were not permitted to chase boar. Jeff is credited with killing 64 bears, Lead, with 59. These are Woody's figures. They lived to a ripe old age in spite of numerous fang-and-claw encounters.

According to Rev. Walker, boar are even worse on dogs than bear. He says, "Hogs are hard on dogs. All these fellows around here have had dogs killed by hogs."

The date for the 1957 Tennessee hunt was set by the Game and Fish Commission for mid-October. There will be 22 parties. Hunters applied to the State Game and Fish Commission, Nashville, for an application form. The 22 lucky applicants will take the trail come October.

Is your crop dry enough
for combining and harvesting?
to prevent molding in the bin?



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Model RC-3 Detector is a product of DELMHORST INSTRUMENT CO., BOONTON, N. J.—manufacturers of crop and soil moisture detectors which have been tested and are in daily use at leading colleges and experiment stations. Price, complete, is $150 F.O.B., Boonton, N. J. Only maintenance cost is inexpensive batteries which last a year.

DELMHORST INSTRUMENT CO.
626 Cedar Street BOONTON, NEW JERSEY

FEED A LITTLE A LOT

(*Continued from page* 43)

Master Ltd., reports that practical experience with little-and-often feeding shows that hogs, too, respond by growing faster and on less feed. David McMaster, the managing director of the company, states that they have found that a hundred pounds of feed can be saved in bringing a pig from 120 to 220 pounds if frequent, limited feeding is used. As yet, no university or experiment station has confirmed these findings, since none of them have carried out the controlled experiments necessary to prove or disprove them. Until such findings are made, the average person will take McMaster's statement with a grain of salt, since his company produces an automatic feeding device which will do the very job that is recommended.

If scientifically controlled experimental work confirms the findings that McMaster and a number of his farmer friends have made, the McMaster company should have a very valuable product. Certainly, the most important objection to such a feeding system is the problem of labor.

But, paradoxically, Dr. H. A. Keener, Professor of Dairy Husbandry at the University of New Hampshire, sees in this whole feeding problem the chance of materially reducing the labor required in livestock raising. Dr. Keener and a graduate student, Burr Clark, are carrying out a

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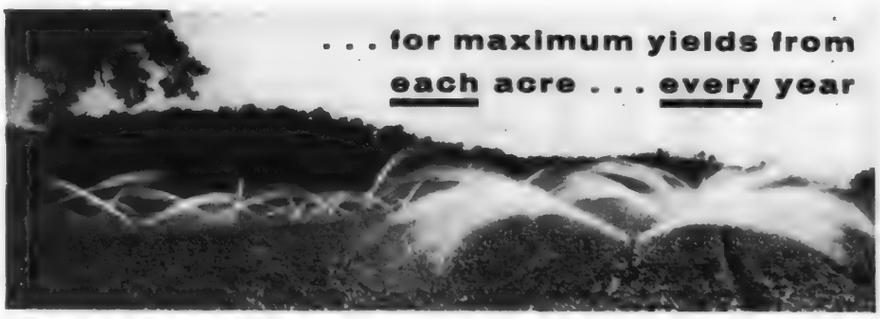

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Why gamble on a crop when you can BE SURE OF A YIELD WITH A RAINMASTER? As a Midwestern farmer put it — "If you don't get rain when your crops need it, you might as well be farming on the desert."

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- 3,500 LB. CAPACITY! Holds 90 bu.—112 cu. ft.
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- MIX TO COMMERCIAL STANDARDS ON YOUR FARM

JUST PUSH IN TO MIX!

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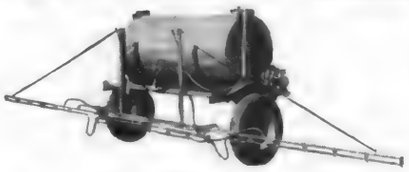

Blue "Chemi-Spreader" equipped with 20 ft. folding "Dribbleboom" and Model "LF" Liquid Fertilizer Pump.

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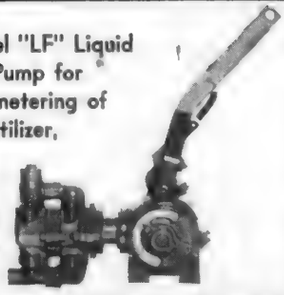
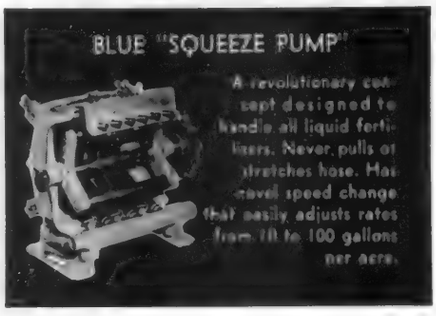
Blue Model "LF" Liquid Fertilizer Pump for accurate metering of Liquid Fertilizer, Nitrogen Solutions and Aqua Ammonia.

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Dependable Farm Equipment Since 1886

feeding experiment with heifers and are using a newly developed automatic device with which to feed them. It is too early to draw any conclusions from the feeding trials, but Dr. Keener is quite willing to say, "The feeding equipment is performing quite well."

Still another automatic feeder has been invented by B. B. Winter, a farmer at Towanda, Illinois. The Winter machine, which will feed cattle, sheep, or hogs, came into being through the pressure of necessity. "Father is such a stickler for feeding cattle exactly on time," Winter said, "that it was only natural that I should try to invent a machine that could be started by a clock and feed the stock automatically."

This is another move toward the goal of building more automation into our livestock industry. Labor costs and the desire for more freedom made us abandon the old methods of hand-feeding for self-feeding. With machines such as these, we will have moved full circle to a type of hand-feeding that can do ten times the job and still leave the stockman free from drudgery. Except for the English feeding machine, you can't buy one of these automatic devices yet. It is worth thinking about, however, if you are planning a new building program. The buildings and layout should be flexible enough to accommodate the new feeders when they come. And they *will* come and probably come fast. As one machinery manufacturer said recently, "It's getting so that when we test a new model, if it works, it's obsolete."

WAR ON WEEVILS

(*Continued from page* 62)

from their chewing makes normal ventilation still more difficult and the pocket of damage spreads.

A study of the life cycle of the insects has shown that at least one of our enemies, the cadelle, bores into the wood of the bin during its larval stages and may remain in the wood itself for long periods waiting for the bin to be filled with grain. Cleaning the bins—which is important in the control of most of the other pests—has little effect on these sleepers. With the discovery of the long-lasting insecticides, we have acquired a good weapon to use against these fat, pale worms. Methoxychlor, mixed as a 2½ per cent emulsion or water suspension and sprayed at the rate of 2 gallons per 1,000 square feet of wall and floor surface area, will kill them as they emerge from the wood to do their dirty work. Another good, long-lasting spray for this job is an emulsion containing one per cent by weight of piperonyl butoxide and 0.1 per cent pyrethrins. One sure way to avoid this cadelle hazard, of course, is to store the grain in steel buildings.

Studies of the life cycles of such insects as the rice weevil and the Angoumois grain moth have shown that in the south and on the east coast where these insects

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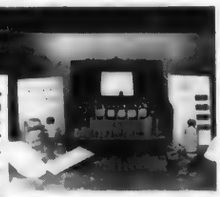

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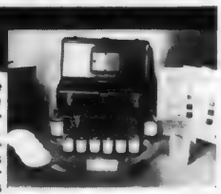

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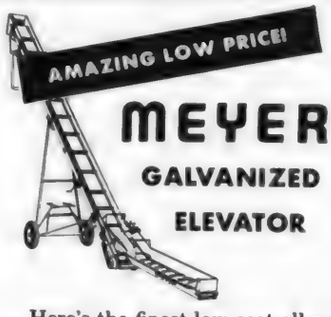

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abound, early harvest of the grain will help reduce the egg laying in the field that infests the grain before it is even binned.

All of these practices are excellent preventive measures, but farmers have been trying for ages to find ways of destroying the insects once they have made a home for themselves in the bin.

Farmers of long ago tried covering the grain with smelly leaves, pouring oil over it, sprinkling it with ashes, sulphur, lime, sand, and dust. From ancient times and even today in parts of India the grain is exposed to the sun, an effective trick since the sun both kills the insects and dries the grain. Just the opposite effect occurred when farmers tried to scald the insects by pouring boiling water into their grain bins. Nor did they have much luck putting a line of sugar up to the bin hoping that the ants it attracted would feast on the grain pests. Only slightly more effective was the practice of throwing old sheep skins over the grain pile at night to attract the insects, which were picked off the skins in the morning.

Finally, came the volatile organic fumigants which can be sprayed on the surface of the grain as a liquid where it immediately evaporates and, since the chemical vapor is heavier than air, flows downward through the mass of grain, killing the insects as it goes. When sprayed on small grain and shelled corn two weeks after it is binned and any time thereafter when insect presence is noted during monthly checks, fumigating will control the pests. A simple way to check is to run a steel rod through the grain, let it stay there for a few minutes, then pull it out and feel the length of it. If there are any

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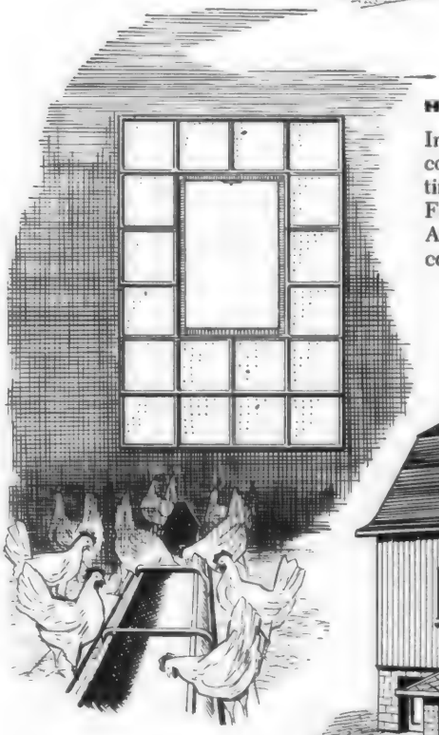

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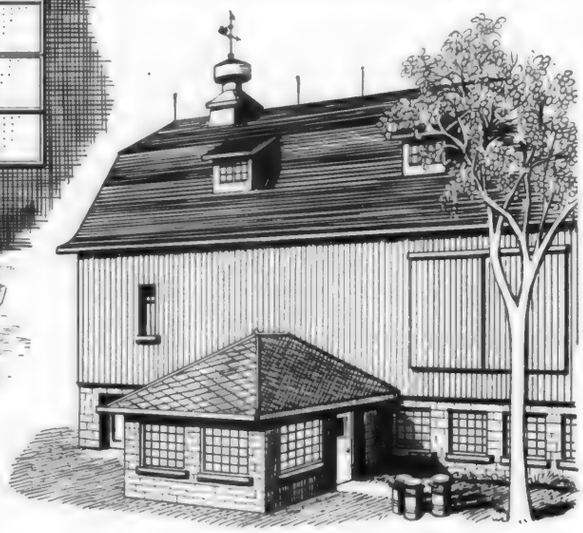

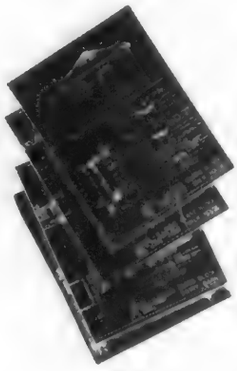

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warm spots, the grain is infected. A still better way is to use a steel rod and thermometer to probe for hot spots. And examining samples of grain is the surest.

The liquid grain fumigants recommended by the U.S.D.A. and the amounts to be used with different grains are shown on page 63. These are the recommendations for use in wooden bins—in steel bins the dosage may be reduced 50 per cent for small grains and 20 per cent for corn and grain sorghum.

Carbon tetrachloride alone is not a quick acting fumigant; it is used with the other, more potent, chemicals mainly as a safety measure since they, particularly carbon disulfide, are explosively inflammable. Mixed with carbon tetrachloride they are not only safer, but may be more potent since scientists feel that there is a synergistic action between the chemicals—each making the other more effective.

Curiously, three of these fumigants, carbon tetrachloride, carbon disulfide, and ethylene dichloride, were at one time hailed as new and promising anesthetics and were used in the operating rooms of our hospitals until it was discovered how deadly dangerous they could be. Now, we are taking advantage of their deadly qualities and trying to avoid their anesthetic power.

There are, of course, other materials, such as hydrocyanic acid, which are good fumigants, but which are just too deadly for general use. Carbon tetrachloride and the three mixtures shown above are the fumi-

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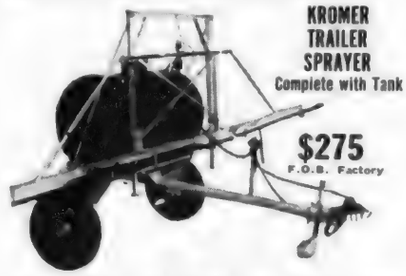

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gants most often recommended for on-the-farm use today, though the search goes on for a material that will be more deadly to insects and less harmful to man.

The best information we have today on the safe use of fumigants comes from the Occupational Health Program of the U. S. Public Health Service. This agency just completed a study on the subject at the request of the U.S.D.A., whose grain storage and fumigation problems are monumental. The grain they have stored in commercial elevators they don't have to worry about, but the millions of bushels they have stowed away in Victory ships and in the steel grain bins that dot every crossroad are a headache. These they must fumigate themselves, using much the same methods farmers use on their on-the-farm-storage.

Being a benevolent employer, the Department was very much concerned over the health problems of the men who did the fumigating and so asked the Public Health Service to make this study. A team of medical men and scientists working out of Cincinnati, Ohio, began a detailed study of the methods used by the government fumigators to see if there could be a safer procedure devised. They also carried on physical studies of the men who were doing the work to find the effect upon them of working with the chemicals. In addition to this they made a search of the literature on the subject to add to their own findings and the discoveries of other scientists.

(*Continued on page* 118)

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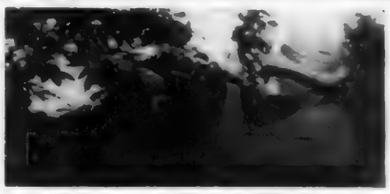

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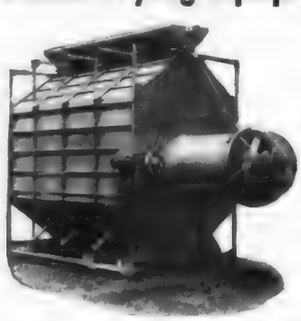

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The effects of the chemicals on man depend upon the amount that is taken in. The mildest dose might cause a headache. Getting more of the poison into the system causes dizziness, loss of reflexes, delirium, and unconsciousness. If a massive dose of the material is absorbed by the body, the next stage after unconsciousness is a paralysis of the respiratory center of the brain, which stops breathing and so causes death.

These are the acute symptoms of poisoning from these fumigants. Much smaller doses over a longer period of time, however, may cause disturbances of a very serious nature. Premature arteriosclerosis is one of these chronic symptoms, as is hypertension, and such nervous disorders as Parkinsonian syndrome.

The scientists also discovered that the size of the exposure is not the only factor that must be taken into consideration. The effects are more serious with some people than with others. They found that alcohol and fumigants have a synergistic effect—they make each other more poisonous to the system. Therefore it is very unwise to drink while fumigating or immediately after. It is also considered a bad risk for a heavy drinker to fumigate even when he has not been drinking for some time, because of the previous damage which may have been done to his system by alcohol.

The aim of the study was, of course, to prevent any damage to workers using the fumigants. At the conclusion of the study, the scientists recommended the following: That the workers have a full-face gas mask with an organic vapor canister. Carbon tetrachloride and the chemicals that are mixed with it are organic materials. The mask should be put on and checked for leaks before the work starts and should not be taken off until after the worker leaves the area. In one county, they found a man fumigating with a good gas mask, but without the proper canister. The canister he had attached to his mask was just fine for hydrocyanic acid, but was no barrier at all to the organic fumigants being used. They warn that the smell of vapor when wearing the mask is a sure sign that the canister is finished or that there is some leak. They also warn that after a whiff or two of these vapors the sense of smell may become anesthetized—therefore the first smell is the best warning and should be heeded immediately.

The Public Health Service has not set out on a scare campaign, but they do feel that the farmer should recognize the seriousness of high exposures to the fumigant. They were shocked at the carelessness of a few individuals. One man, for example, wore a mask that had two broken straps and so couldn't be made to fit his face properly. He continued to wear the mask even though it leaked a little. Another preferred to use a mask that had a slightly broken hose because it breathed easier.

They found that when the men worked on steel bins where they stood on a ladder outside the building and sprayed the fumigant through a removable panel in the roof, the heavy vapor spilled out the opening and flowed down across the canister of the gas mask which was carried under

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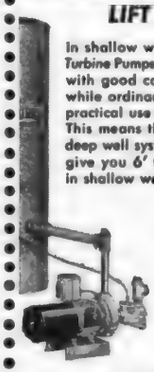

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the arm or in front of the body of the worker. This observation led them to recommend back-pack type canisters which are normally held away from such heavy concentrations of vapor.

Because of the vapor concentrations around the bin, they recommend against fumigating unless there is a breeze to dissipate the vapor. The government crew were using power sprayers and the men operating the pump were often in rather heavy concentrations when there was no wind. The same condition might exist around the base of the farm bin that had been sprayed with a knapsack sprayer. Farmers should be sure that spraying is done when there is a breeze to blow the excess vapor away. Bins that are located in the barn are more difficult to handle, but doors should be opened and any other means used to get the best possible ventilation around the bin site.

During the hot days the workers stripped off their shirts and enjoyed the cool vapor of the evaporating liquid pouring over their body, but the scientists knew that in testing rabbits and other animals they could detect measurable amounts of fumigant being exhaled from the lungs when the only way the animal could get vapor into the system was through the skin. They recommend that all workers wear full clothing with sleeves down during fumigation.

They also strongly urge workers to avoid getting the liquid fumigant on the skin since it can cause second and even third-degree burns. At best it will defat the skin and cause it to crack.

After the fumigation is completed, the recommendation is that no one enter the bin without a gas mask for at least seven days. When the week is up, the doors or other openings to the bin should be opened to permit airing for at least a half hour before entering. In tight bins more time

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should be allowed to elapse.

Fumigation is our best answer today to the age-old problem of insect infestation. It will save your crop, but it could cost you your life. Here, in summary, are the rules to follow in playing it safe: 1. If you are a heavy user of alcohol, let someone else do the job. 2. Wear a full-face gas mask with a proper canister for the job. For carbon tetrachloride fumigants use a canister that is for organic materials—not your souvenir from World War I. 3. Use a back-pack harness for the canister. 4. Put on the mask and test it for leaks before starting and don't remove it until the job is done and you are away from the bin. 5. Replace the canister when its use-time has expired. 6. Keep fully clothed during spraying. 7. Don't get spray on body. 8. Spray only when there is a little breeze. 9. Don't go into the bin without a mask for seven days after spraying. 10. Remember, any time you get a whiff of vapor you are in danger—get out of the area and find out what the trouble is.

For further reading: Since the Public Health Service study covered only carbon tetrachloride and carbon disulfide, other materials can be studied in "Insect Pests of Stored Grain and Grain Products," by Richard T. Cotton, Burgess Publishing Company, Minneapolis, 1950. "Crop Protection," by G. J. Rose, Philosophical Library, New York, 1955. "Handbook of Agricultural Chemicals," by L. W. Hannah, published by the author, 1952.

STAN HAGEN WORKS FOR PABST

(*Continued from page* 41)

udder trouble," Hagen points out, "as well as to prevent overfeeding of the calves. We also estimate the ration for the cow from the milk production."

After two months on the nurse cows, the calves are switched to powdered skim milk. The Pabst dairy plant produces large quantities of this product and they vigorously endorse it by using it themselves. The heifers get this skim milk until they are eight months old; it is fed to the bulls until they are ten months of age because of their relatively slower development.

To make the milk ration, one pound of the powdered material is mixed with 8 pounds of water at a temperature of near 105 degrees Fahrenheit. It is allowed to cool to just a little less than body temperature by the time it is fed to the calves. The amount fed will vary from 16 to as much as 24 pounds a day, depending upon the age, size, and condition of the calf.

After having their milk ration, the calves are held in stanchions for half an hour with grain before them to keep them from sucking each other.

Beginning when they are about two weeks old, the calves are given bright, green, mixed hay, which aids in developing the rumen. Hagen underscores the Pabst theory that "too much alfalfa causes scouring in very young calves."

They get some silage, only as much as they will clean up, and as already noted, some grain. A sidelight on Pabst efficiency

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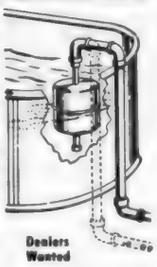

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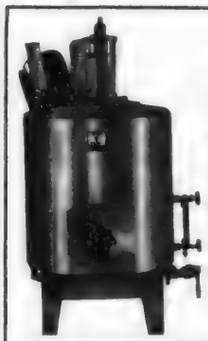

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is revealed in a note appended to the instructions on feeding calves: "Grain not eaten is removed before fresh is added and fed to cows or older calves by mixing it with their ration. *We cannot afford waste!*"

To exercise greater control over their feeding and handling, none of the calves are put on pasture until they are eight months of age.

All the heifer calves are dehorned either with caustic or by the use of electric dehorners when they are two to six weeks of age. None of the bulls are dehorned.

Sick calves are immediately isolated to an individual pen and all calves are given 10 cc. of hemorrhagic serum and 5 cc. of hemorrhagic bacterin, subcutaneously, within 12 hours after birth, to give them protection against colds and pneumonia. All calves are broken to lead soon after being taken off the nurse cow. Some pick up the accomplishment in as short a time as a half hour; others take much longer. Basically, the training consists of pulling them along by a rope halter.

When they are eight months old the heifers are transferred to an open shed, where they have access to pasture and to racks filled with hay at all times. During the winter, they are fed some silage (all they will clean up once a day); mineralized salt and steamed bonemeal are available free-choice; and when they reach the age of 13 months, their grain ration is discontinued. They are bred as soon as possible after they reach 16 months. "We stanchion them with the milking herd for about two months before calving," Hagen adds, "and they are brushed and handled to make them gentler and easier to milk."

Cows in the test barn are fed basically the same ration as has been outlined above. They are put on test three days after calving. The 63 cows in this barn will average about 70 pounds of milk per day. Usually about one-fourth of the cows in the barn are in full production, about one-fourth are finishing their lactations, and the remainder are between these two extremes. Many of the cows will hit 100 pounds a day or better and it is not unusual to have a dozen at this mark.

The milking intervals in the test barn are 5 a.m., 1 p.m., and 9 p.m. The cows are turned out all night after the last milking when the weather permits and spend two to four hours on pasture during the morning if the flies are not bad. They are usually kept in during the afternoon. "Usually each man has certain cows to milk," Hagen says, and he emphasizes, "the barns must be kept clean at all times."

A frequent enjoiner throughout the Pabst instructions is "consult the herdsman." In handling the bulls this is just about the first and last word, for, say the rules, "Feeding breeding bulls differs greatly with individuals, and it is very difficult to lay down any definite rules. The herdsman must be the one to give directions, and he must be guided by the condition and the bull's serving ability. One

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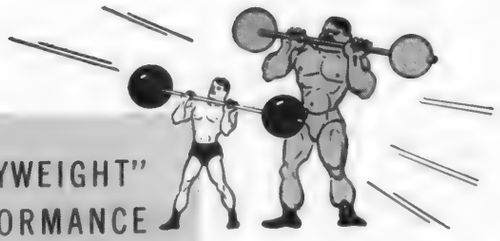

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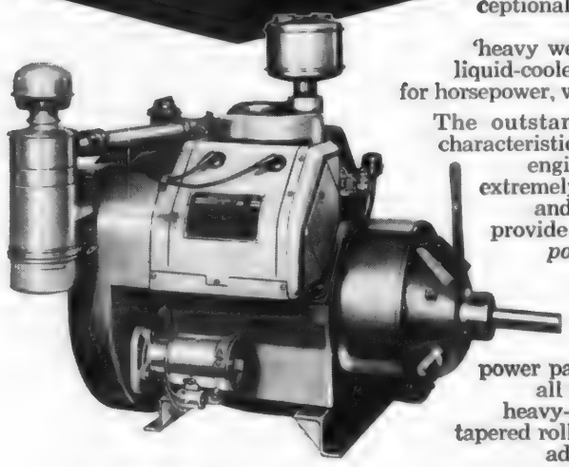

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This new engine rounds out a complete line, comprising 15 models in 4-cycle single cylinder, 2- and 4-cylinder sizes, from 3 to 56 hp. Write for "Spec" Bulletin S-207.

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good rule is never to overfeed; in fact, feed very sparingly. Feeding grain varies from 2 pounds up to 15 pounds a day."

Silver Weiler summarizes bull feeding with the warning, "Don't let a bull get too fat. A three-year-old bull can be put in condition very easily. Older bulls need more feed. Let your eye guide you."

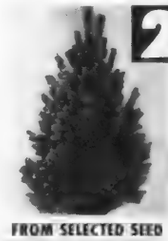
Semen is collected from the young bulls when they are 10 months old and tested for motility. All breeding at the farm is by artificial insemination.

The Pabst rules require the use of different sets of brooms and forks in the mangers and on the floors and gutters. All tools used for manure are painted red to prevent their use in the mangers.

The instructions also state the cows' Bill of Rights. "Animals are entitled to careful handling," it says. "You will never be blamed for giving them too good care."

"Keep in mind," it continues, "that a cow does not bawl without some reason—being in heat, having no water, another animal being loose, or some other reason. If you hear one of them bawl, investigate and find the reason. Acquiring this habit will promote efficient management."

Based on his five years' experience in the Pabst barns, Stanley Hagen's advice to dairymen is, "Don't neglect your cows. The average dairyman probably wouldn't feed as heavily as we do in the test barn," he says, "and since he isn't shooting for records he probably shouldn't. But it would really pay off if he would give more time to his cows. That's where we have the advantage here. We don't have to do both barn work and field work; so the cows don't suffer because the hay has to be cut or the corn picked. Keeping the cows well groomed, comfortable, and well fed pays off better than any other job."



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ALL ABOUT MOTORS

(*Continued from page* 55)

resilient based motor should be employed. Resilient base motors are available in ratings up to and including 5 hp.

After a motor has been selected, the proper installation to the load, determination of correct wire size, protecting and controlling the motor are important links in getting its rated horsepower.

On the farm almost all motors are connected to their load in these ways: (1) Through gears, (2) Directly or by means of coupling, (3) By belts and pulleys.

Since the few farm machines which have gears are usually designed and built at the factory for correct speed and power, it is best that the farmer purchase a complete gear-motor assembly when changing.

On all applications where both the motor and the machine operate at the same speed, and mounting conditions are satisfactory, it may be desirable to make a direct coupling between the motor and the load. Direct connections are often used in driving pumps, blowers, fans, crop driers, and other similar machines. Direct drive requires careful alignment and the use of a coupling that is flexible or at least partly flexible. Clutches, both disk and fluid, can also be used when it is necessary for the motor to start and approach full load speed before it picks up the load. Clutches are also used to prevent stalling of the motor in the event of accidental overload.

By far the most commonly used method of connection of motor to its load is the use of belts and pulleys. V-belts and V-pulleys are normally used for the job of coupling a motor to driven equipment. This choice is normally made because V-belts permit lighter, more compact assembly, provide good grip between belt and pulley, so they will operate with low belt tension. They are easy to install and replacements are readily available in most service stations and hardware stores.

The size and type of V-belts to use for a given drive depends chiefly on the size of the motor pulley and the speed and horsepower of the motor. The belts and pulleys should be matched for either V-belt or U-belt use.

Two inches is about the minimum size for a motor pulley, especially for motor sizes of one-half horsepower or larger.

In selecting the proper pulley combination it is necessary to know the speed of the motor (which can be obtained from motor nameplate) and the speed of the driven equipment. In the selection of proper pulley sizes the following equation can be used:

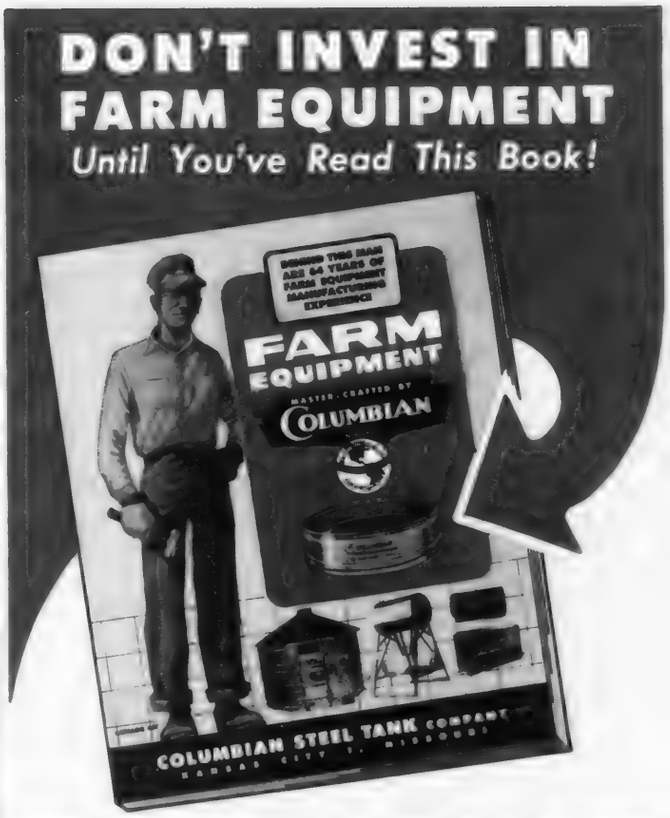
$$\text{Rpm of motor} \times \text{dia. of motor pulley} = \text{rpm of driven equipment} \times \text{dia. of drive pulley.}$$

For example, if a motor which has a speed of 1750 r.p.m. is being used to drive a hammermill at a speed of approximately 300 r.p.m., with a 2-inch diameter pulley on the motor shaft, what size pulley should be used on the driven equipment?

$$2 \times 1750 = P \times 300$$
$$3600 = 300\ P$$
$$12 = P;\ \text{or a 12-inch pulley is required}$$

Motors should be mounted with some provision for tightening and loosening the belt. Only reasonable tension is necessary with a V-belt drive. When in operation the tight side of the belt should form a straight line from pulley to pulley while there should be a slight sag in the back side. Running belts tighter than necessary can cause motor bearing and failure, plus excessive belt wear. When placing the belts on the pulleys, never force them on; always loosen the motor mounting so that the belts can be easily slipped on. Care should also be taken so that proper alignment of the pulleys is maintained. Poorly aligned pulleys cause added strain on motor bearings.

If the voltage at the motor terminal is appreciably lower than that for which the motor is designed, the motor current for a



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Hen houses, turkey sheds and other open shelters for livestock or poultry may be permanently or temporarily closed in with wind and weather-resistant 6 mil clear Durethene polyethylene film. The film should be held in place by batten strips, on three sides of the structure. The open side should be the side farthest away from the direction of the prevailing wind.

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You can keep your silage from spoiling by oxidation with a bunker silo cover of sun-resistant, black, Durethene polyethylene film. Durethene film is extremely easy to handle; it's light in weight—100 square feet of 4 mil film weighs less than 20 pounds. It is available in widths up to 20 feet, 100 feet long in black or clear.

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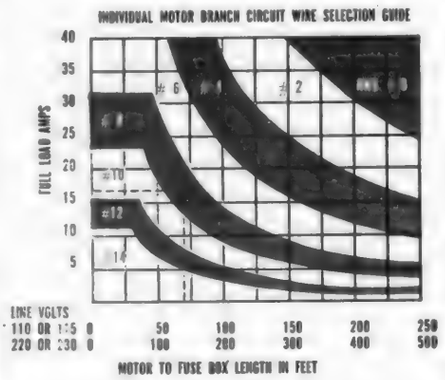
given load will increase rapidly. Since the output (power produced) by a motor is a result of both voltage and current, an appreciable voltage drop causes a higher current and results in an increase in the motor heating. Under certain conditions the heating can increase in proportion to the square of the current. Under these conditions doubling the current increases the heating effect approximately four times. This is why low voltage can cause motor burn-out.

This same voltage drop produced by improper wire size has another important effect on the motor—the reduction of motor torques. Any change in voltage, from the voltage for which the motor was designed, will vary the torque of the motor.

SELECTING WIRE SIZE

If wire size is selected from the following chart the motor performance will not be adversely affected by voltage drop in the branch circuit.

Example: With F. L. Amps=17; Line volts=115; 70 ft. length of line; dotted lines on chart intersect in #8 band; use #8 AWG wire.



Conductors (the wires) are manufactured in different sizes to carry different amounts of current. The smaller (diameter) the wire the larger the gauge numbers and vice versa. The current carrying capacities of these insulated wires increase with the physical size of the wire. For example, a No. 8 wire which is approximately .128 inches in diameter will carry safely up to 80 amperes, depending on the type of insulation, whereas a No. 10 wire, which is approximately .102 in diameter will carry only a maximum of 55 amperes with the same insulation.

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Capacity to match either one or two-row corn pickers makes the new Haban Field Husker-Sheller a sensation in cost-saving corn harvesting and handling. Hooking between picker and wagon, it husks, shells, cleans and delivers the shelled corn into wagon box. Send for catalog.

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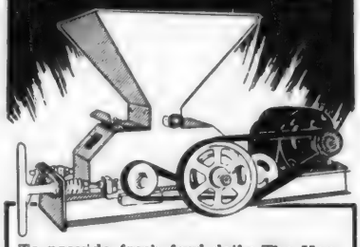

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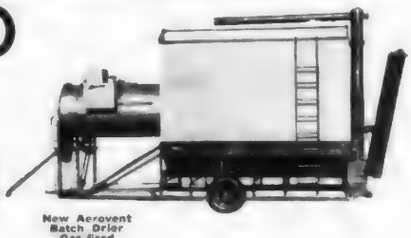

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In order to assist you in selecting the proper wire size for motor branch circuits, many motor manufacturers, farm equipment manufacturers, National Electric Code book, Electrical text books, the Industrial Committee on Interior Wiring Design Handbooks and most of your local power companies have prepared charts or tables for your use. These charts show the wire gauge number for a given distance and motor full-load current based on various voltage drops. Opposite is a chart showing wire sizes for individual branch circuits. If the wire size is selected from this chart the motor performance will not be adversely affected by voltage drop.

Motor controllers may vary considerably depending upon a wide variety of situations. Common forms of controllers are the manual and the magnetic type. The manual type has a handle or toggle button for hand operation. The control is sold minus the overload heater coils or strips and is adapted to the various motors by changing heaters. Selection of the overload heater is normally based on the full-load current of the motor; however, it is best to refer to the chart inside the cover plate of the control. This type of starter is normally designed for infrequent starting and stopping of small AC motors up to and including 7½ horsepower, and cannot normally be used where under-voltage protection is required or for remote or automatic operation. It is also best to mount

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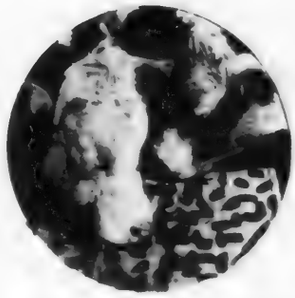

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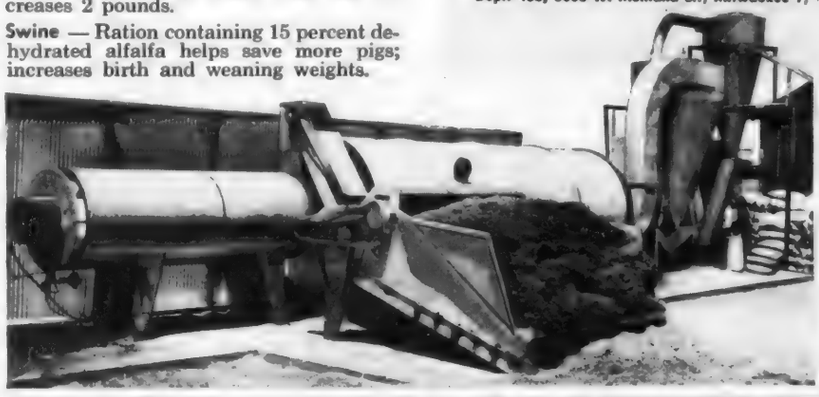

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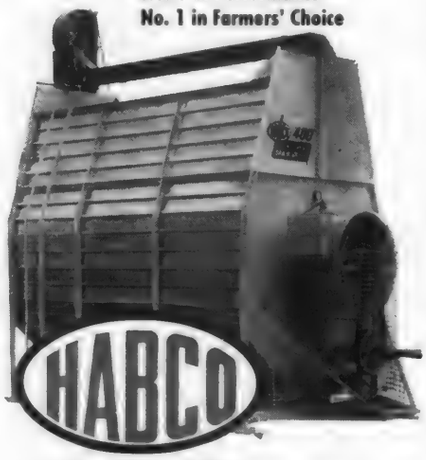

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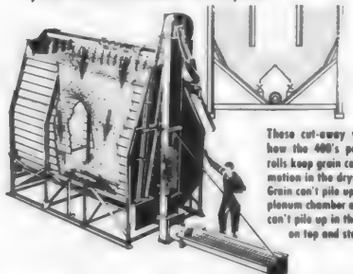

These cut-away views show how the 400's positive feed rolls keep grain continually in motion in the drying column. Grain can't pile up around the plenum chamber and scorch—can't pile up in the corners or on top and stay wet.

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We made the first, and still sell the best portable farm crop dryers

this type control within sight of the machine being controlled.

The magnetic type control operates by an electromagnet which is generally controlled by a push button at the controller or at some convenient remote location. This type start is generally designed for full voltage, frequent starting of AC motors. Thermal overcurrent relays provide complete overcurrent protection and can easily be changed from manual to automatic reset.

A built-in temperature current sensitive device is by far the most fool-proof type of protection. Because this type of protector is enclosed in the motor, it is always exposed to the same surrounding temperature as the motor itself. This avoids nuisance cut-outs sometimes encountered when a remote protector is located in a hotter atmosphere than the motor. It also eliminates the under protection when the remote protector is in a cooler atmosphere.

A motor with automatic reset built in protection should never be used when an unexpected restart may injure personnel or damage property. A manual reset should be used for safety.

A dependable source of power, long life, and years of trouble-free service with a minimum amount of care and preventive maintenance are available with electric motors. The care and preventive maintenance for motors involves cleaning, proper storing, proper lubrication, periodic inspection of bearings, checking of commutators and brushes, seeing that fuses or other protective devices are in good condition and that all connectors and contacts are properly made. The manufacturer of your motor may list additional things to do but for the most part it just takes horse sense to keep a motor going. However, let's elaborate on a few points which are the most important.

Cleanliness is an important factor in the life and operation of motors. As most motors used on farms are of the open dripproof construction, there are openings in them for ventilation and these allow dirt and foreign matter to enter the motors. Under most conditions motors will operate for long periods of time without a thorough cleaning. Since most motors on farms are single phase, they require a switch, relay, or brush and a shortening device for the transfer from the start winding to the run winding. Dirt, dust, or foreign material in these parts could impede the motor operation and cause overheating and motor burn-out. Don't judge that the motor doesn't need cleaning just because it still will turn over. Dust on the slip rings, commutators and brushes act both as an abrasive and insulation, multiplying wear and blocking passage of current. Dust also has the ability to soak up moisture, water, and oil, and cause pasty and gummy layers which can be harmful to the insulation of the motor. Dust inside a bearing housing and bearing can be as harmful

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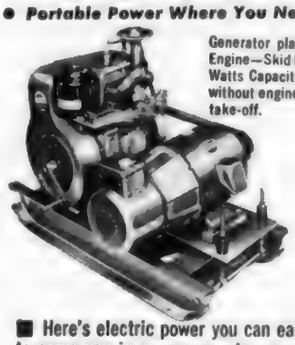

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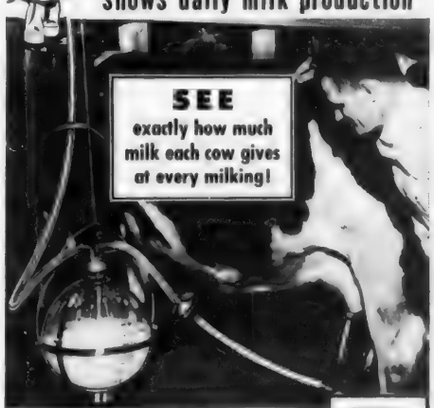

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Graduation marks on the Pyrex glass sphere show production of each cow. To empty, roll sphere on its axis, vacuum draws milk into the line. The unit is cleaned "in place." Butterfat samples are easily taken. Sphere is held in stainless steel, cushioned in rubber. Weight, 15½ lbs.

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as sandpaper to the highly polished surface as well as contaminate the grease and oil.

If, after a visual inspection of a motor, you find that it requires a general overhauling and cleaning, you should carefully take it apart after first wiping the outside clean from foreign material. This can be done by first removing the through bolts or clamp bolts holding the endshields of the motor to the frame. Then, carefully remove the rotor with its endshield. If the motor is of the type which has brushes, it is advisable to remove them first to avoid breaking them when removing the rotor. Then the heavy dirt or grease should first be removed with stiff fiber brushes or scrapers and cloths. Grease, oil, and sticky dirt may require the use of some solvent. Different types which are on the market can be used but a non-inflammable solvent is recommended. When applying solvent, care should be taken so as not to soak the insulation, as some solvents may have a softening effect. After using a solvent, a fan, heat lamp, or large light bulb should be used to dry out the winding.

Dry dirt or dust can be blown out with dry compressed air.

If the motor has a sleeve bearing, remove the yarns or wicks and wash out the oil well. It is advisable to replace the wick with a new one. If the motor is of the type on which the ball bearings must be cleaned and lubricated while the motor is apart, then remove the bearings and clean thoroughly. Clean the grease reservoir and reassemble bearings on the shaft after adding grease between the balls and races. Fill the grease reservoir ½ to ¾ full.

Check all moving parts such as transfer switches, brushes and centrifugal mechanism to insure that wear is not excessive and that all are in operating condition; then reassemble the motor.

Motors are silent, cooperative, extra farmhands as long as they have the kind of treatment they deserve; ten, fifteen or twenty years is their normal life expectancy.

THE AUTHOR: O. E. Benanchietti is an electrical engineering graduate of Pennsylvania Military College. At present he is application engineer at General Electric's Fort Wayne, Indiana, motor plant. He lectures frequently on electric motors at farm and university meetings and is the author of a number of articles on this subject. He is a member of the American Society of Agricultural Engineers, American Institute of Electrical Engineers, and Fort Wayne Association of General Electric Engineers.

THYROPROTEIN

(*Continued from page* 46)

stations. The amount we aim for in feeding the thyroid hormone is 1½ grams per 100 pounds of body weight. This supplies a high level necessary for best milk and butterfat production."

How do you feed thyroprotein?

"One laboratory is making thyroprotein at this time, Cerophyl Laboratories, with offices in the Board of Trade Building in Kansas City, Missouri. They produce it under the name 'Stimulac,' with the hormone combined with pelleted alfalfa meal. This serves as a carrier, so that one pound of the pellets fed over the top of any good dairy feed will give the cow the desirable amount of the hormone to increase the

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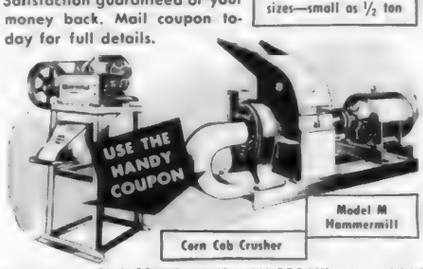

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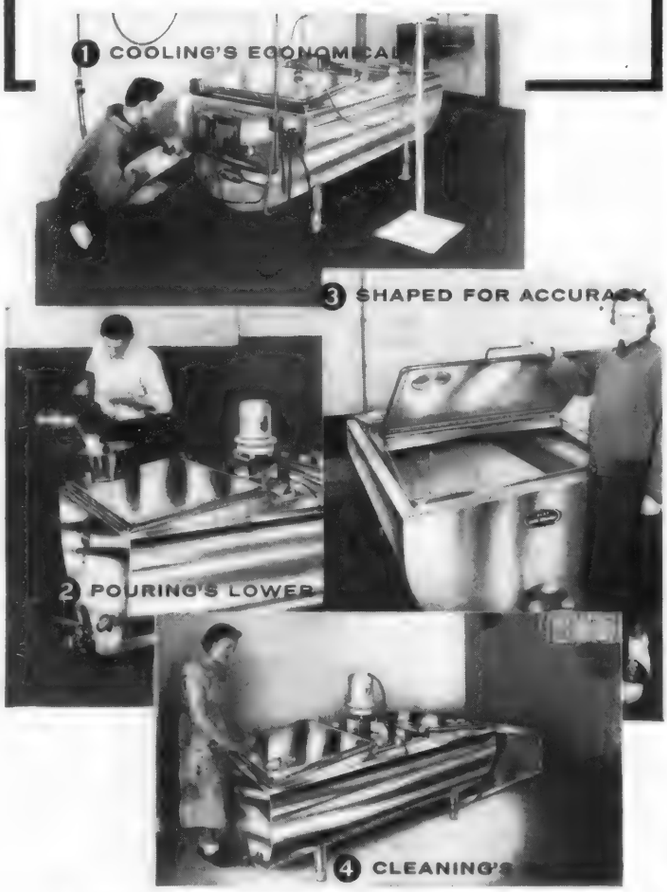

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milk and butterfat production. Production increases on a normal herd will run from 20 to 25 per cent more milk and .2 to .4 per cent higher butterfat test.

"For many years dairymen have tried for high milk production. A rule of thumb many dairymen have used is to increase the cow's feed by one pound of dairy feed for each 4 pounds of milk produced a day.

"Now, if you further increase the milk production of the cow 20 per cent by feeding her thyroid hormone, you are going to have to feed her with about three pounds more of her grain ration a day to supply the energy and raw materials for the milk production and to keep her in good flesh.

"Any high-production cow will lose 50 to 75 pounds during a lactation period. A cow being fed thyroprotein may appear to be losing more weight than normal during a lactation. When this happens it is because she is in her peak milk production trim; like an athelete she has lost her paunch.

"Thyroprotein feeding should be started 60 days or more after a cow freshens, just about the time her production curve starts to swing downward, and fed until you are ready to dry off the cow. When you dry off a cow you can stop the hormone feeding abruptly, if you wish. At any other time, before drying off, the feeding of the alfalfa pellets containing the hormone should be decreased to ¾ pound the first week, to ½ pound the second week, to ¼ pound the third week, and for the final week feed her ⅛ pound.

"Like other proteins, thyroprotein is digested and taken into the bloodstream in the animal's intestines. We are taking over the function of the cow's thyroid gland. Whenever you give a hormone to an animal, it stops the secretion of the same amount that you supply. Therefore, we supply the total amount needed to produce the maximum amount of milk and butterfat. In other words, we are not doing a supplemental feeding job. We do not stunt her ability to produce the thyroid hormone once the feeding of hormone is discontinued. But she will take a

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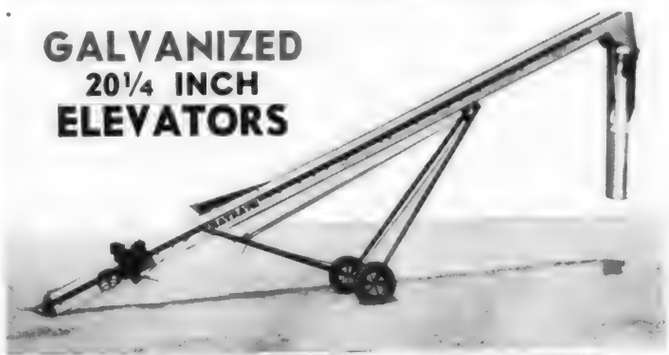

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MAYRATH

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month's time to come back into her own production of the thyroid hormone."

What happens if cows get an overdose?

"It is not dangerous in slight overdoses, just expensive. We have purposely fed cows three times the normal amount for several weeks without any bad results. In one case, a herd broke into the feed room and gorged themselves on the fine quality alfalfa pellets in which the hormone is carried. The herdsman discontinued feeding the pellets for a week, then put them back on their regular hormone ration with no bad results."

Other questions that have come up on the effect of feeding thyroprotein to dairy cows can be answered with a very few words. It does not affect a cow's breeding ability and may improve it. It does not carry through into the milk. It is permitted by boards of health and the Federal Pure Food and Drug Administration for dairy farms on Grade A production. It does not shorten a cow's life and it may lengthen it. Doctors often prescribe the thyroid hormone for people who are deficient. There are plenty of indications that the hormone may lengthen the useful life of many cows.

Official Testing and Hormones

Thyroprotein may be fed when cows are on Dairy Herd Improvement Association tests, as it fits into the program of increasing the efficiency of the cow and her production per feed unit. The fact that it is being fed should be noted in the record book. Its use is not permitted on Advanced Registry testing, for the purpose of these tests is to prove the breeding program and inherited ability of the animal for milk production. The feeding of the thyroid hormone increases her ability to produce milk over that she has been given by inheritance.

The USDA publication, "Agricultural Research," of November, 1956, said in part: "Many previous trials have shown that thyroprotein, available to dairymen in commercial feeds for a number of years, increased milk production as much as 20 per cent in some cows for short periods. Total milk produced for the entire lactation, however, was not increased by the use of thyroprotein when it was fed either for short periods or throughout the lactation.

"More recent experiments have shown widely varied responses among individual animals. The tests also demonstrated once more the seemingly inevitable drop off in milk output once the drug is eliminated.

"There is, however, the possibility that thyroprotein might be used to advantage by large commercial dairymen. Its use could be a means of stimulating milk output during the periods of normally low production when milk prices are high and when marketing bases are being set up."

Other thyroprotein researchers counter these statements by pointing out that the number of USDA test cows was too small (the last report listed 3 locations with 55 cows in 5 groups, and a control group of

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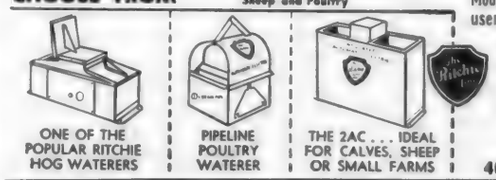

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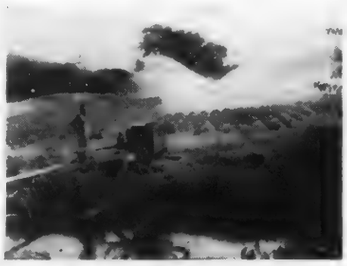

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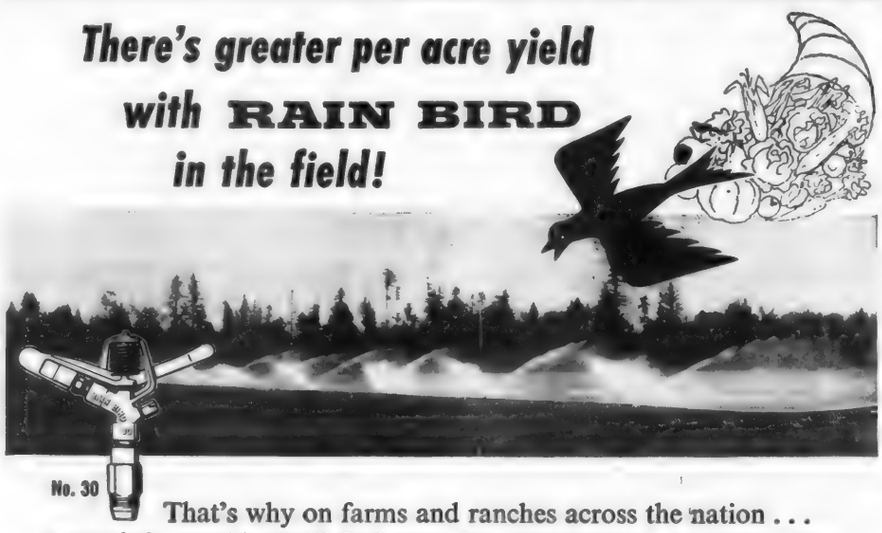

No. 30

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Remember, if it hasn't the name... it isn't the same. Specify RAIN BIRD!

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VANCOUVER 4, B. C.

Latest literature on request.

17 cows). They point out that USDA cows have been bred for years for a high productivity by the use of a succession of proven sires, therefore should have a high thyroid hormone secretion rate normally, which might well account for lack of spectacular increases in production in the tested cows. In interpreting the USDA results it is also pointed out that an unknown number of the test cows were fed only one gram of the thyroprotein per 100 pounds of body weight, well below the recommended amount, and that the hormone feeding was discontinued too soon (90 days before calving) for best results in the entire lactation.

The USDA statement that thyroprotein might be used advantageously by large commercial dairymen has led many dairy farmers with 20 or more cows to become very interested in feeding it. Its use to build a good base marketing quota for dairy farms in Federal Marketing Areas during the base setting months of July, August, September, and October has real profit possibilities. Says Professor Eric W. Swanson, of the Dairy Husbandry Department at the University of Tennessee: "If feeding thyroprotein were to accomplish nothing more than trading April and May (surplus) milk for December and January (high priced base) milk, it would be an economical practice in many herds. This effect may also be used to increase the base marketing quota so that a greater portion of the producer's milk will be sold at the high base price."

In a paper presented at the American Dairy Science meeting in 1953 by Professor Eric W. Swanson and S. A. Hinton, they summed up the dollars and cents value of their work as follows: "Feeding thyroactive supplement to good dairy cows well past the peak of lactation, for 100 days in the fall and winter has proved to be an economical practice. The average daily increase in production of eight cows compared to eight normal control cows was 7.4 pounds of 4 per cent milk. This results in a profit above feed costs of $24.25 more for each cow in the supplemented group. It also established a base of 32.7 pounds more per day, which was considered to be worth $7.82 per cow under the price existing at the time of the experiment."

Where It's Being Fed

Not every cow will respond to thyroprotein, either, but $25 to $150 extra per month on the milk check of the good average dairyman can keep him interested.

Supervised feeding programs with tabulated results at the end of the year are underway in Georgia, Florida, Illinois, Wisconsin and Minnesota. In Wisconsin and Minnesota, Doughboy Mills, whose sales manager, Laton W. Henderson, a former member of the N. J. Agriculture Experiment Station, has over 10,000 dairymen with cows on the thyroprotein feeding program. Fieldmen tabulate the results at the end of the farmer's participation in the program. Below is a typical tabulation sheet of Eugene Schneider of

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It's a big surprise to many people to find that these attractive trouble free Rilco Utility Buildings with no interior posts can actually cost less than buildings designed for only a 15 to 20-year life. In some spans the cost of all materials above foundation for a genuine Rilco Utility Building is only approximately 78¢ a square foot. The secret, of course, is in the efficiently designed, factory-made glued laminated wood rafters. They mean big savings in erection time.

"It's a nicer looking barn... and more efficient, too!"

SAYS MRS. ERNEST THOMPSON—MONTEREY, INDIANA

Mrs. Ernest Thompson, Monterey, Indiana, knows that looks are more than skin deep when it comes to farm buildings. "We certainly like the appearance of our new Rilco barn," she says, "but even more important, it's more efficient, too!

"We could hardly believe our eyes, that barn went up so fast. It was finished in four days."

Here's how these rafters are made. Layer on layer of kiln-dried West Coast Douglas Fir are permanently bonded under pressure, with waterproof glues, to the precise shape required. Then, Rilco rafters are cut to size and drilled for connections. All necessary hardware is furnished. This way, 4 or 5 men can erect the rafters for a building in less than half a day. For complete information, send the coupon below.

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LOCATION OF FARM 2 mi. W. Plainview NO. OF ACRES 160
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TYPE OF MILKING SYSTEM: ✓Stanchion; ✗ Milking parlor.
CLASS MILK SOLD: ✓A; B; C; Cream. MILK SOLD: Cans; ✓Bulk.
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406# b.f. Weigh-A-Day-A-Month; Other; None.
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FEEDING RATE: One pound to 4 lbs. of milk.

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Price for 3.5% milk ..... $3.62 B/F Diff: 7¢ per point.
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GROSS PROFIT ON STIMULAC PROGRAM..... $.42
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NET PROFIT PER COW PER DAY..... $18.2
EXTRA NET PROFIT PER MONTH: $18.2 x 30 days $5.53
NUMBER OF COWS ON STIMULAC: $5.53 x 9 cows = $49.95 TOTAL EXTRA PROFIT PER HERD PER MONTH

Melvin Heibel, of Route One, Clear Lake, Wisconsin (his picture is shown on Page 46) started 28 of his 34 Holsteins on the hormone program in January, 1957. His butterfat increased .2 per cent in 3 weeks and his milk went up 3 cans, about 240 pounds or 21 percent. "Those milk truckers sure liked the program," says Heibel. "They got all that extra milk to haul. I got a gain of $10.43 a day and my increased costs of hay and feed came to $5.98, which gave me a real profit of $4.45 a day. It was like adding 3 cows to my herd without having to pay for them, or feed them, or milk them."

Frances Foucks (see page 46) of Route 2, Deer Park, Wisconsin, got started on the thyroid feeding program approximately 150 days after his 12 cows that he put on it had freshened. This fall, when his cows come off pasture, he intends to put them on as they reach the 50-day mark. He feeds his own corn and oats and 20 per cent dairy feed. On his rolling Wisconsin hill farm he likes to keep a good stand of quack grass in with the alfalfa to hold the soil. His milk goes to Ulmbach by bulk tank truck from his own bulk tank. Of the 12 cows to which he fed thyroprotein late in their lactation, two did not respond. His DHIA records showed the cows that did respond produced 32 cents net more for milk and butterfat a day. This worked out like this:

.32 x 30 days = $ 9.60 month
$9.60 x 10 cows = $96.00 month

These 10 cows averaged 96 days remaining in their lactations. In other words, Foucks came out about $300 better on milk checks for this spring before he dried the cows up.

Thyroid Hormone for Sows

Just recently the results of feeding thyroprotein to hogs in tests at Iowa State have been announced. It's early in the testing program with sows but the results so far are most promising. Dr. Catron pointed out, "In the tests so far conducted at Iowa State College, we have weaned an extra one-third to one-half pig per litter."

He pointed out that this method of feeding thyroprotein differs entirely from the method used to increase the milk production of dairy animals. Dairy cows are fed Stimulac as a supplement to their regular high-energy dairy ration.

In summarizing the feeding, Catron said: "Feed only highly fortified rations, mixed by a competent feed manufacturer or custom grinder and mixer. Start feeding the hormone feed about 3 days before farrowing. Be sure to supply plenty of clean, fresh water. It takes lots of water to produce lots of milk. After the sow farrows, feed all she will eat."

FARM BOOKS RECOMMENDED BY THE EDITORS

Here are basic reference books on subjects in this issue:

Feeds and Feeding (22nd ed.)—by F. B. Morrison **$9.50**
The authoritative book on livestock and poultry feeding.

Beef Cattle—by Roscoe R. Snapp **$6.50**
A carefully revised edition of this excellent book on beef production.

Profitable Sheep—by Spelman B. Collins **$7.50**
The best beginner's sheep book we've seen.

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Soils and Fertilizers—by Firman E. Bear **$6.50**
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Revised edition of this information-packed book.

Swine Production—by W. E. Carroll & J. L. Krider **$6.50**
The do's and don'ts of turning feed into pork and on into cash.

Agricultural Cooperation—by Martin A. Abrahamsen and Claude L. Scroggs $7.50
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Cotton—by F. Barnhart **$3.75**
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Shopwork on the Farm—by Mack M. Jones **$6.75**
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From My Experience—by Louis Bromfield **$4.00**
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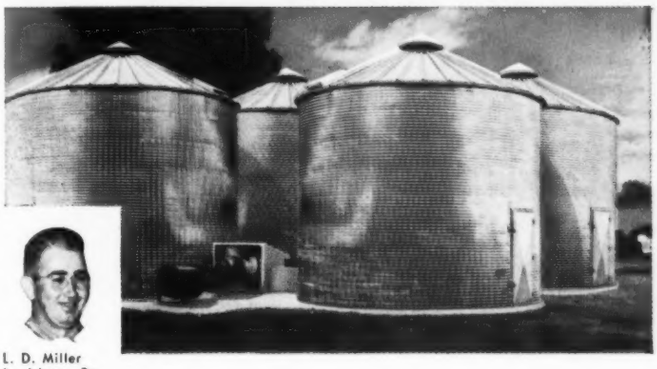

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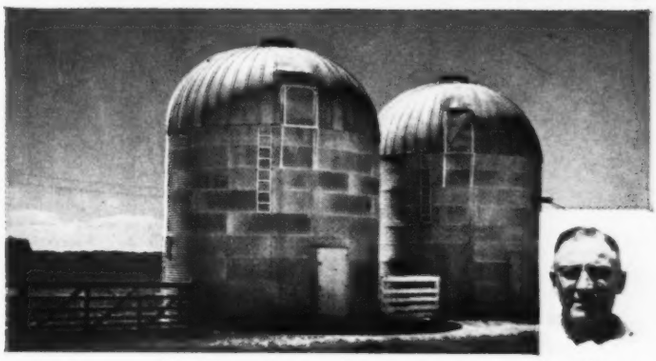

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Paul Harsh
Prospect, O.

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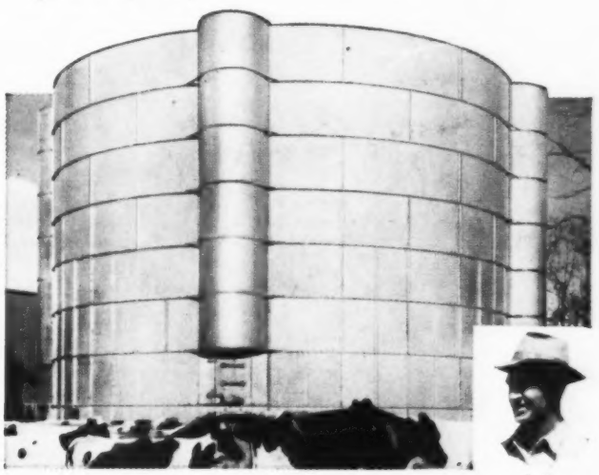

L. Begg
Col. Grove, O.

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W. Skinn
Norwalk, O.

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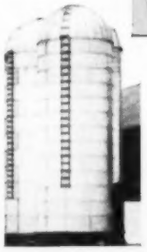

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317 Longview Ave., Mansfield, Ohio, Dept. 1118

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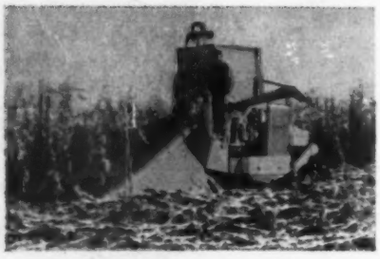

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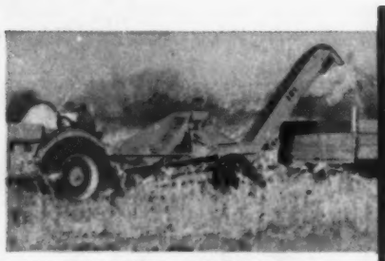
LOOK AT THESE FOR ADVANTAGES!

Three gathering chains for each row . . . five-position floating points . . . snapping rolls 53½ inches long . . . side-to-side and rotating raddle action on the Uni-Huskor . . . four-section metal and rubber husking rolls . . . full-length corn savers and high-speed cleaning fans make MM Huskors winners in competition—*money-makers* in corn.

SEE YOUR MM DEALER! He's got the best corn tool deal he's ever had for you. See him, get the reasons why MM machines make corn *pay* . . . as no others can.

MINNEAPOLIS-MOLINE MINNEAPOLIS 1, MINNESOTA



MM PULL-BEHIND HUSKORS—For years the Corn Belt favorite—now better than ever with a host of new advantages. MM pull-behind Huskors are available in 1-row and 2-row models.

MM MOUNTED HUSKORS—Champion MM performance in a compact 2-row Huskor that mounts on your MM tractor. Available for MM Models, ZAN, ZAU, ZBN, ZBU, UBN, UBU, UTN, UTU-445.

MM QUALITY SHELLERS—*the leading sellers by far!* Give your snapped or husked corn preferred treatment with MM Shellers. Two models, capacities from 175 to 1200 bushels per hour, both belt or PTO powered.